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ABSTRACT

This monograph reviews discussions of the nature of syllables, in order to determine the usefulness of the syllable as a tool in teaching children to read and spell. The review found that the nature of the syllable remains controversial; there are at least four different definitions in the contemporary literature. The sharpest disagreements seem to be between linguists concerned with phonetics, who view the syllable as complex, and educationists concerned with phonics, who in general accept the dictionary rules of syllabication. The research evidence reviewed suggests that the teaching of dictionary syllabication does not result in consistently greater gains in reading and spelling. Programs incorporating alternative approaches to syllabication are described, and recommendations to teachers are formulated on the basis of the literature reviewed. (AA)

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THE SYLLABLE:

ITS NATURE AND PEDAGOGICAL USEFULNESS

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Patrick Groff
Professor of Education
San Diego State College

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Northwest Regional Educational Laboratory
500 Lindsay Building/710 S.W. Second Avenue
Portland, Oregon 97204

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Northwest Regional Educational Laboratory, 500 Lindsay Building,
710 S.W. Second Avenue, Portland, Oregon 97204

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Chapter I

THE ADVICE ON DICTIONARY SYLLABICATION

Among teachers and teacher educators the syllable is a widely-used term given to a purportedly well-defined segment of linguistic phenomena. It is almost impossible today to find a discussion for teachers regarding reading and spelling that does not include authoritative sounding comments on syllabication and its usefulness.

Many educationists feel that the way the dictionary syllabicates words is not only proper but should be taught to children as a means of speeding up their processes of learning to read and spell. Fewer educationists contend, to the contrary, that teaching dictionary syllabication is misleading, futile, and a waste of time.

Dictionary Syllabication: The Comments of Advocates

In their 1914 spelling book for teachers, Cook and O'Shea wrote that "dividing a word into syllables* may act as a preventive of error to the extent it secures correct pronunciation."[32] Ten years later Tidyman advised in his spelling methods book that "a good practice is for the teacher to dictate the original pronunciation, with the word written in syllables on the board."[157] A generation later we see this idea reflected in the counsel of Fitzgerald, a respected authority in his time on the teaching of spelling: "the child should be taught that dividing words into syllables is helpful in learning the spellings of the words." "In the steps in learning to spell a word syllabication should be practiced. The proper use of words requires a mastery of syllabication."[57]

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*Unless otherwise noted in this monograph, syllable division or syllabication, as used in the quoted material, refers to dictionary syllabication, that is, the syllabication of words based on the rules or practices found in a traditional dictionary.

Business educators, in agreement with well-known educationists, have endorsed the teaching of dictionary syllabication. According to one business educator this teaching makes the "student more pronunciation conscious," more "conscious of the construction and derivation of words," and "develops his analytical ability."[79] Another educator believed that "anybody armed with this half dozen simple precepts [as given by Davis] can quickly and easily conquer his syllabication complex."[38]

Eminent educationists have for many years been equally convinced of the utility of dictionary syllabication. Dolch insisted that "no reader can tell which consonants go with which vowels [in a word] until he has divided the word into syllables. This the beginner must do by conscious rule." "Syllabication is thus naturally a matter of thinking of rules of attack." Dolch believed pupils, "must have a method of attack, that is, conscious rules to follow."[45] He maintained that "what the schools definitely need is a teaching of the phonics of polysyllables."[46] In support of this, Betts proposed a sequential program wherein the child, in this sequential order: (a) identified vowel letters, (b) counted the number of syllables in a word, (c) noted which were accented, and (d) decided on which vowel rule would help him know this.[10]

More recently, the most influential proponent of teaching dictionary syllabication was the late William S. Gray. His hypothesis was that "if pupils are to progress in reading, they should learn how to apply visual clues to vowel sounds in two-syllable words. To do so, they must learn how to divide printed words into syllables." This involved, he believed, pupils becoming "adept at discrimination between accented and unaccented syllables in spoken words."[72] Gray, in his well-known guide on phonics for teachers, listed at least twenty complex rules of syllabication that pupils should learn for this purpose, e.g., "pupils note that a single consonant letter following a single vowel letter before an ending or suffix (that begins with a vowel) may be a clue either to a dropped final e or to a long vowel sound in an accented final syllable of the root or to an unaccented final syllable of a root."[72]

Many have followed Gray's lead. The program for teaching dictionary syllabication in Smith's recent book on reading[147] is largely replicative of Gray's thinking on the matter. Durkin also closely follows his precepts. Recently she noted that "phonetic analysis of a word begins with the division of that word into syllables. Once the word is correctly divided, phonetic generalizations can then be applied to each syllable." Accordingly, "some knowledge of generalizations about accents can be helpful to the child in his readings." "Locating the syllables in a word that get this special stress is part of the job involved in arriving at the correct pronunciation of the word."[49]

Durkin contends that to successfully read a two-syllable word, a child must first have learned Gray's syllabication rules, and then must make an elaborate search, retrieval, and application of the appropriate rule. For example, she explained how this is done with argue:

> Now let's return to the child who was reading and found himself puzzled by argue. To figure out what it is, he should begin by considering its likely syllabification with the help of the (four) generalizations just cited. The one that is relevant for argue states: When two consonants (r and g) appear between two vowels (a and u), a syllabic division

> generally occurs between the consonants: *ar* *gue*. Since *ar* contains only one vowel and *gue* includes one vowel plus what is probably a silent *e* (a final *e* generally is silent), further syllabification is unlikely. And so the child is now ready to consider possible pronunciations for each of the two syllables: *ar* and *gue*.
>
> For instance, in analyzing a word like *argue*, a child would first divide it into syllables (*ar* *gue*) and then make decisions about the likely sound of each. Arriving at these sounds often will be enough to suggest to the child a word he recognizes in its spoken form. With this recognition--in the case of the word *argue*--there also comes an awareness of the first syllable being the accented one.
>
> If the word *argue* is already familiar to the child in its spoken form, then the sounds derived from his phonic analysis of the written version immediately suggest both the word and its meaning. Thus, knowing the word in its spoken version, combined with the context in which the written form appears, both confirm the correctness of this phonic analysis of *argue*. [50]

We shall see that there are a few who disagree with this elaborate scheme. They are outnumbered, however, by many who follow W. S. Gray's dictum, and are thus convinced of the appropriateness of instruction in dictionary syllabication. As a further example, Osburn insisted that "we can hardly expect pupils to recognize or to spell words of more than one syllable until they are conscious...of the syllables that are involved." This "consciousness" is gained first, he believed, by getting "the pupil to spell correctly the syllables which he will need most often" in his writing, and second, by giving "particular attention" to unaccented syllables. [124] Hanna agreed with the idea that:

> ...an exaggerated pronunciation also enhances the possibility of taking full advantage of morphological cues in many spelling words." "By pronouncing clearly each syllable in *debate* so that the prefix /de-/ is said and heard with the vowel sound heard in *be*, the pupil is helped to associate the graphemic option (E) with the first vowel sound which it represents. [80]

Craven gave five "ways in which correct pronunciation can be helped in correct spelling. In all of these one principle is essential. Divide words into syllables."[34]

Dolch apparently set the tone for the general procedure the later advocates of dictionary syllabication urged teachers to follow. He condemned any practice that "actually leaves it to the child, consciously or unconsciously, to form his own rules or method" of syllabication. The teacher must, he insisted, teach, and expect the child to apply rules taken from the dictionary that "are not rules for the pronunciation of English."[47]

Quite recently Anderson concluded that "it should be noted that in reading, a child seldom needs to divide a word into all of its syllables. However, in spelling this is...required.... It is not unreasonable to have intermediate grade children write their spelling lessons in syllables."[6] We learn from Burns and Lowe in their more recent text for teachers, that "some attention may profitably be given to...syllabication."[22] And from Tiedt and Tiedt that dictionary syllabication "assists the child in identifying sounds and in attacking the complexity of the polysyllabic words."[157] Ross' belief that "thinking of the pronunciation of the syllable in the related noun [frugality] tells us how to spell that syllable in the related adjective [frugal] [139] also finds it place in this body of favorable opinion about the teaching of dictionary syllabication. As expected, dictionary publishers also support this practice.

Of ten "dictionary authorities," (members of four companies which publish dictionaries) when asked by Mower and Barney about this, six said dictionary syllabication of words was "indispensable." The remaining four declared it "useful" or "fundamental."[121]

A roll call of some of the more well-known authorities in reading and spelling instruction leaves little doubt of their support for teaching dictionary syllabication to children:

Bond and Bond:

> The teaching of syllabication is a good means of getting the child to separate words into relatively large recognition-units. 14

Bush and Huebner:

> Children have to learn to use a number of [dictionary based] generalizations in breaking words into syllables. 23

Carter and McGinnis:

> In order to employ structural analysis adequately, the student must be skilled in syllabication. 26

Cordts:

> Many teachers find the rules for pronunciation and syllabication useful in word perception and reading. 33

Dawson and Bammon:

> An understanding of syllabication is vital to good spelling, speaking, and writing. 39

Dechant:

> Much learning, however, can be simplified if the pupil can apply these rules and principles effectively. 42

Lillian Gray:

> To determine the position of the vowel "u" in the word "pupil," for example, it is first necessary to find the syllables by structural analysis. Only then will it be evident that the first "u" is at the end of the first syllable and thus should be given the long sound of the vowel. 71

Albert Harris:

> The most generally useful form of structural analysis is syllabication. 83

Heilman:

> The ability to break words into syllables is a very important word-analysis skill and cuts across both phonic and structural analysis. 85
> How well a child masters the basic pattern of syllabication will influence his progress in independent reading. 86

Hildreth:

> Use the dictionary as a source of information for breaking words into syllables...expert spellers invariably pronounce and spell by syllables when dealing with longer, regularly formed words. 88

Morrison:

> Words should be divided only between syllables. 119A

Strang, McCullough, and Traxler:

> Those who do poorly [in syllabication] should be given additional practice. 154A

Tinker and McCullough:

> [The child's] word analysis will become much more effective as he learns syllabification. 158

Wallen:

> The reader who can identify the syllables in lengthy new words will be able to pronounce those words nearly as easily as he can pronounce short, one-syllable words.... The reader can become both a rapid and independent reader only if he learns to perform the third procedure [the use of dictionary syllabication word attack] successfully. 164

Witty and Freeland:

> [Syllabication is one of the] major principles in a word-analysis program. 169A

Some advocates of dictionary syllabication are so confident that this practice is assumed by all to be of merit that they think no defense for its use is necessary. 16 Even those who support a language experience approach to the teaching of reading, an approach that breaks sharply with the basal reader orientation of most reading experts, are not immune from the belief that dictionary syllabication should be taught. 75 It should be pointed out, however, that the advocates of this approach apparently are unsure how intensively to teach this matter. As Davis pointed out in 1969, dictionary syllabic division was "inconsistently introduced and maintained" in the six series of spelling texts she examined. She found the number of syllabication generalizations these texts indicated should be taught to range from seven to twenty-two. 37

Dictionary Syllabication--
Comments of Adversaries

Not all writers in elementary English are Gray's or Dolch's disciples. Some do not defend, or choose to ignore this practice. 73 Russell concluded, in contradiction to Gray, that "research studies have not given clear evidence of the values of structural analysis when taught by itself as a technique of word recognition."[141] While conceding that "possibly a little of such practice [pronouncing isolated words syllable-by-syllable] is necessary;" Lefevre, a linguist, insisted that this be "certainly not drill." For him, when generalizations about syllabication are made, they should be made by the child "for himself, inductively, and with a minimum of help from teachers."[108] Harris, keeping in mind the difficulty of dictionary syllabication, noted that "it is probably unwise to spend much time on rules of syllabication below the sixth grade."[83] Spache gave a much stronger disclaimer:

> It is very doubtful that they [syllabication rules] are long remembered or have any great functional value for maturing readers. In some informal experiments that we conducted with college freshman, little relationship was indicated between retention of syllabication rules and success in analyzing words into syllables.[150]

Spache's discovery that a correlation between teachers' abilities to syllabicate words according to the dictionary, and their knowledge of dictionary syllabication rules was only .26, undoubtedly led him to this contention.[151] He continued:

> In question in the teaching of syllabication is the utility of the various rules. Should pupils be taught a number of stable, consistent principles? If so, which principles? Is a knowledge of rules essential for reasonable success in syllabication or can the skill be learned by rule of thumb? In other words, is precise syllabication needed for a functional use of syllables in reading, spelling, and writing? Is there evidence that mature readers use the rules they have been taught, or are they reasonably successful in discriminating syllables without such knowledge? Unfortunately there are very few conclusive answers to these questions.[150]

Anderson and Groff maintained that "for the purposes of spelling; dictionary syllabication is not necessary, nor has it proved to bring on greater gains in spelling."[7] Stauffer also chose to confront more directly the advice on syllabication which we have seen so many reading experts accept: "No pupil has learned to be on his own in reading by memorizing the hundreds of rules supplied in On Their Own in Reading by Gray," retorted Stauffer. He admitted, however, that syllable rules are of some value in spelling, and it is in spelling class that they are frequently taught. They are of some value in the early learning-to-read stages when on occasion, if a child syllabalized a word and then speaks it, he may identify it as a spoken word he knows."[152]

Durrell, another well-known reading authority, does not even list the study of dictionary syllabication rules in his word-analysis program for primary grades. The primary grade child learns high-frequency phonograms (at, it, un, et, etc.) instead. Durrell insisted that in the middle grades "it is helpful to ask pupils to listen for syllables in words." This is done by counting the number of syllables heard in words as they are read aloud. Pupils in these grades are also asked to read a list of words divided according to the dictionary, and then to read these same words not broken up into syllables. Durrell resisted the notion of teaching children dictionary-based rules of syllabication, however.[51]

In his discussion of cue systems in reading, Goodman appeared to go farther than Durrell in questioning the usefulness of syllabication. "Within words" he noted, "there are these cue systems:

Letter-sound relationships (phonic generalizations)
Shape, or word configuration
Known little words in new words
Affixes
Recurrent spelling patterns
Whole known words[146]

The cue systems to word recognition within words should not include, in Goodman's judgment, any reference to dictionary syllabication. De Boer and Dallmann agreed that:

> It is not essential to the recognition or pronunciation of a word to know exactly where some of the breaks between syllables occur. For instance, a child does not have to know whether the division of syllables in the word tumble comes before or after the b in order to pronounce the word correctly. [41]

McKee, addressing himself to this same question, stated:

> In some schools it has been the custom to teach the pupil (1) the relation between the number of vowel sounds in a word and the number of syllables in that word, and (2) at least two if not more rules for determining what are the syllables in a word. This knowledge is supposed to be used in unlocking strange printed words. The author has no serious objection to letting the pupil know that usually the number of syllables in a word is the same as the number of vowel sounds in that word. But rarely, if ever, has he found that any pupil who has learned to use...context and letter-sound associations for consonants...needs to use a knowledge of rules of syllabication in order to call to mind the familiar spoken word for which a strange printed word stands. Consequently this volume does not recommend that the pupil be taught to use syllabication rules as aids in unlocking words which are strange only in print. [117]

Wardhaugh, a linguist, is as severe in his rejection of teaching dictionary syllabication as McKee. He wrote:

> Reading teachers are asked to teach their children to divide words as follows: but-ter, mon-key, rob-in, and ro-bot; even though, as has been pointed out elsewhere...such rules are often quite circular, have nothing to do with the actual sound patterns of English and almost nothing to do with line-breaking conventions, and have hardly any possible application beyond the typesetter's domain. They certainly do not make sense as a systematic statement about the syllables of the spoken language, nor are they entirely consistent with one another,...if children can use them, they do not really

> need them, because their use requires that children have the very knowledge the rules are supposed to be teaching. 167

Wardhaugh contended that "statements about units such as prefixes, roots, and suffixes and for compounding do have some value." 167

Schell comes to largely the same conclusions in his comment on the "inaccurate instruction" given as dictionary syllabication." 144 He contended that not only do such "instructional techniques frequently fail to distinquish between reading and spelling," but "it appears that sometimes it is not clear whether pronunciation or syllabication comes first." To Schell, the advice from leading experts in reading (a) that children should be taught that the vowel sound in paper is long and therefore the first syllable is probably pa; or (b) the advice that when two vowels come together and each keeps its own sound, they form separate syllables, are both wrong. Schell continued:

> Both of these principles imply that the pupil must pronounce the word before he can syllabicate it. But, if he can already pronounce the word, why should he need to syllabicate it? Furthermore, the latter generalization is a tautology: the dependent and the independent clauses say the same thing, just in different words. The definition of a syllable is such that this statement does not really tell one anything; it only masquerades as information. 144

Troup agreed: "Over the years, educators set up a kind of a phonics system based on a mechanical practice that was never intended to relate to speech." 159 For example, the dictionary syllabication of vision is vi-sion; the speech syllabication: visi-on.

Resolving the Conflict over Syllabication

It is apparent from the representative sample of opinion given here, regarding the usefulness of teaching dictionary syllabication rules, that experts in reading and spelling instruction take decidedly opposite positions on this matter. These different sides, like others, can give the impression of cancelling each other out. This is particularly true here, because few references to facts, either of a linguistic or experimental nature, have been made in either the pro or con argument about dictionary syllabication. The apparent insolubility of this issue indicates the need for further information gathering and documentation, the purpose of the next two chapters.

In Chapter II, dictionary syllabication will be compared to the definition of syllabication given by linguists. We will uncover the true nature of the syllable as the science of language, linguistics, describes it. We will discover that linguists do not believe dictionary syllabication to be a true or accurate way to syllabicate words, lending support to those who insist that this form of syllabication need not be taught to children for them to learn to read and spell.

Chapter III will review the experimental evidence taken from research studies of the effect of teaching dictionary syllabication on the child's growth in reading and spelling abilities. If this evidence indicates that such instruction does not bring on statistically significantly longer gains in these abilities than does no instruction in syllabication, the comments of the supporters of teaching dictionary syllabication will necessarily suffer, and can be seen to be of doubtful value.

Summary

The conflicting statements regarding the usefulness of instruction in dictionary syllabication cannot be accepted one way or the other without some additional verification from linguistics and from psychological research. To make a valid decision on this matter, an accurate description of the syllable is needed as well as the disclosure of the research on whether teaching dictionary syllabication has any special pedagogical usefulness. Questions to be answered in this explanatory process will be:

1. Which reading experts base their comments about syllabication on the linguistic nature of this phenomenon? Which do not?

2. Which reading and spelling experts' comments are supported by the research on the teaching of dictionary syllabication?

To answer these questions we must inquire into others:

3. What has been the place of the syllable in the development of written language?

4. What are the disagreements over the nature of the syllable currently heard among linguists?

5. How accurate a description of the syllable does the dictionary make?

Chapter II

THE HISTORY AND NATURE OF THE SYLLABLE

While almost all teachers of reading and spelling can give an example of a cluster of graphemes (letters) they call a syllable, the complex nature of the syllable is belied by this seemingly wide-spread understanding of its form. The syllable, while it results from understandings of language from ancient times, remains today among linguists an often-discussed and highly-controversial aspect of phonetics. This present chapter will exhibit two things about the syllable which contrast with the general opinions of teachers and teacher educators: (a) its controversial nature, and (b) the mistaken confidence educationists and teachers have put into the accuracy of a non-technical explanation (a dictionary explanation) of its structure. This confidence may have led teachers to wrong judgments about the usefulness of this linguistic phenomenon in helping children learn to read and spell.

History of the Syllable

A discussion of the relationship of the syllable to the learning of an alphabetic writing system should first note that historically, syllabic writing preceded alphabetic writing. Man knew or recognized the nature of the syllable before he discovered or invented the idea of an alphabet, i.e., the idea that each sound in our language can be represented by an alphabetic sign, or letter as we call it. Children, who apparently recapitulate the development of language awareness in mankind, comprehend and produce syllables long before they can comprehend the nature of our spelling system (phoneme-grapheme correspondences).

We learn from the history of writing that logograms, signs for words, at one time were the basis of the common system used to record language. This rebus way of writing was discovered to be impractical to the communication needs of its users, however, since speed and accuracy of writing suffer when it is used. The practice of writing identical syllables of various words with identical signs then became established. What the early users of this word-syllable writing understood was that all these signs originally stood for total words in the language. As a consequence of this they discovered the practicality of using some of these word signs as syllable signs.

This preceded, of course, the advent of alphabetic writing: "The earliest developed form of word-syllable writing was that of the Sumerians in Mesopotamia at the end of the fourth millennium B.C. [3,000 plus years before the birth of Christ]. The Egyptians had their own system within a century or so of this."[13] The Phoenicians adopted the straightforward system of syllable writing by discarding all of the word signs that were used in word-syllable writing. By about 1,000 B.C. they had developed a completely syllabic form of writing with no word signs and no signs for more than one syllable. As in most syllabaries, each consonant was paired with each vowel of the language. Alphabetic writing is approached when in such writing as the Phoenicians, "a class of words ends in the syllable -ba [for example], and in the course of time the vowel ceases to be pronounced."[94] In this syllabary the placement and values of vowels had to be guessed from the context of the writing. Vowels, however, are given distinct signs or letters in alphabet writing.

Historically, then, "for languages with regularly recurring patterns of syllable clusters, of which English is not one; there arose the development of the syllabary."[31] In transition, the step from pictographic to syllabic writing is an easy, logical and...self-evident one...," for "if syllables are generally or always simple in structure, a syllabic system of writing may work extremely well."[94] This is the case in Japanese which still uses syllabic writing, that is, a series of signs representing syllables in which each consonant of the language is paired with each vowel. While the Elamites in the third millennium B.C. had 131 syllabic signs, there are forty-seven signs in the present Japanese syllabary: a-e-i-o-u (single-letter signs); and the coupling of these with nine consonants to make two-letter signs as seen, for example, in ka-sa-ta-na-fi-ma-yu-ra-wa.[66] It can be easily seen how writing with a syllabary would be different than writing with an alphabet.

A remarkable leap in linguistic practice was made with the development of the alphabet. The Greek alphabet as we know of it today was "independently developed from an adaptation of the Phoenician script, itself a derivation of the Egyptian writing system."[136] It was "the first true alphabet expressing the sounds of a language by consonant and vowel signs."[131] The earlier Phoenician system was largely a set of consonant signs, the vowel being supplied by the reader from the context of the writing. However, in contrast "...what the Greeks did was to apply certain consonant signs of the Hebrew system standing for consonant sounds not used distinctively in Greek to represent the Greek vowel sounds."[136] The Greeks added vowel signs to ambiguous syllabic signs, probably to avoid confusion and to simplify the system of writing. This Greek alphabet, which now expressed single sounds of language using signs for both consonants and vowels, was "the last important step in the history of writing from the Greek period up to the present, nothing new has happened in the inner structural development of writing. Generally speaking, we write consonants and vowels in the same way as the ancient Greeks did." [66] This is the alphabet that has "conquered" the world of writing. "As the signs for consonants are used in approximately the same way in all the alphabets of the world, the various types of alphabets can be distinguished only by their use of vowel signs." [66]

A question remains: Why at this particular time (ninth century B.C.) did the Greeks develop or discover an alphabet? We will probably never know the psycholinguistic reason for the exact period in which this development took place, but there is logical speculation about why it took place. We have seen that man moved from word-syllable writing to syllabic writing for the sake of speed and accuracy. Yet we realize that modern languages (Japanese) which use a syllabary do not apparently suffer a lack of speed and accuracy. It is even true, as Bloomfield [12] pointed out, that when persons acquainted with modern writing devise a system for illiterate people they sometimes find it easiest to teach syllabic writing.

One logical reason for the change by the Greeks to an alphabetic form of writing has been given by Hughes. In Semitic, where the vowel was silenced in syllables (for example, BA) it was "almost inevitable that every user of the language should develop a concept of the phoneme--a notion which is fundamental to true alphabetic writing;" [94] and "the difference in the structure of Greek, required vowels to be included in order to achieve an unambiguous reading." [58] It seems inevitable, then, that the concept of one sound--one letter was to appear in the Greek consciousness of language. Again we see, as Cook explained it, that the development of an alphabet was very likely caused by the fact that the Greeks did not have a small, regularly recurring set of syllables. When these cluster combinations of sounds are regular, the syllabary system works very well, as it does today in Japanese.[31]

The Greeks had also developed words with two or more consonants in a single syllable. This made syllabic writing cumbersome. An example from English will illustrate:

> A word like 'fa-mi-ly' can easily be represented by a 'syllabic' alphabet, but a word like 'strength'with its clusters of consonants would have to turn every consonant into a syllable, thus producing something like 'se-te-re-ne-ge-the.' The development of the modern alphabet where symbols represent sounds is much more economical and adaptable, even when, as in English, a one-to-one correspondence between symbol and sound can no longer be assumed.[166]

It was "the Greeks who, having accepted in full the forms of the West Semitic syllabary, evolved a system of vowels which, attached to the syllabic signs, reduced the value of these syllables to simple consonantal signs, and thus for the first time created a full alphabetic system of writing."[66]

In the years since that time the alphabet has reached civilizations in all parts of the world, but no reforms have taken place in the Greek principles of writing: "Hundreds of alphabets throughout the world, different as they may be in outer form, all use the principles first and last established in Greek writing."[66]

The Nature of the Syllable

The previous section has depicted the nature of the syllable as hardly a recent discovery: "Since the time of the ancient grammarians and inventors of scripts there has been an awareness of some rhythmically occurring events in speech, namely the syllable."[109] There is little doubt then, that the nonscientific concept of the syllable "has existed since ancient times."[69] Bolinger wrote:

> If puns and pig Latin prove a dim awareness of phonemes, verse proves a full awareness of syllables; syllable-counting is an old as poets and poetry. Young children are aware of them too, they exploit the effect of spaced-out syllables in their jeering chants (Fred-die-is-a-fraid-y-cat), and emphatic warnings like this one from a four-year-old, with each syllable separately accented: You-bet-ter-not-say-that-to-mo-ther![13]

The divergent opinions about syllabication seen in Chapter I may be caused by a misunderstanding of educationists and teachers regarding the difficulties in determining what a syllable is, and how it is perceived and produced. This confusion, however, is not due to teachers' inabilities in detecting or perceiving the number of syllables in a word. As one phonetician observed, "most people seem to be able to say, without much difficulty, how many syllables are contained in a given word or utterance;"[98] and another stated: "the syllable would appear to be an intuitively recognizable unit even for primitive peoples."[1]

While teachers have little trouble in detecting syllables, the important thing they often do not realize, according to linguists and phoneticians, is that syllables are not units of writing. Nor are they parts of grammar or structure,[4] "syllables are units of sounds, not of writing,"[78] as we shall describe below:

> When English words are divided into writing according to their 'syllables,' the division points have little or no relevance to phonological facts. The actual division points have evolved through many years of concern with proofreading, typesetting, laying out written words as attractively as possible, and breaking words at line ends.[168]

In dictionaries "the actual pronunciation may be ignored if it conflicts with the morphemic analysis, the morphemic boundary being used instead," e.g., "*trai-ning* versus *train-ing*."[116] It is not the number of syllables in a word that causes the difficulty in their analysis, but the boundaries of syllables.

In our society it has been observed that by the age of six months the "cooing [of infants] changes into babbling resembling one-syllable utterances." By eighteen months the infant's speech contains "much babbling but now of several syllables with intricate intonational patterns."[109] By this time the young child is able to produce phonetically what is needed for an adult to say a polysyllabic word, syllable-by-syllable. It is clear, then, that by the time a child is ordinarily taught to read he has had several years of practice in producing syllables in words of varying length. Some linguists go so far as to say "the humble, unpretentious native speaker,...subconsciously knows infinitely more about his language than any scholarly book has yet described."[94] Syllable perception should become generalized by the time children are five or six. There also appears to be a positive relationship between their powers of perception of the pitch of sound and their perception of vowel and consonant sounds.[67]

Exactly when and how an "instinctive" awareness of the syllable led to a scientific concern with this linguistic phenomenon remains speculation. We have seen that syllabaries preceded alphabetic writing, which infers that in the historical development of any culture's conscious recognition of the various aspects of language, awareness of the syllable preceded the discovery of the alphabet, much in the same way the wheel preceded the steam-driven train. As language-generating creatures we seem to have an inherent feeling or perception for the syllabic structure of speech. A scientific study of the syllable had to wait until the middle of the nineteenth century however, when phonetics emerged as an autonomous branch of linguistics.[114]

While the genesis of syllabication study is hazy, there are several general statements that most linguists accept about the nature of the syllable. First, "the syllable, rather than the individual speech sound, is the irreducible unit of speech."[24] It is the "most elementary combination of speech sounds;"[120] and it is so fundamental a notion of common speech as well as phonetics, that "even a person without any linguistic training usually has a very clear idea of the number of syllables in a spoken chain."[115] The effects on versification of syllable-counting are known to everyone. The syllable is fundamental because:

> ...the sounds of most phonemes cannot be uttered effectively by themselves. One can barely produce the sound of /g/ without a vowel before it or after it--that is, without putting it in a syllable." "In the syllable the phoneme comes to life" so "an essential part of the description of phonemes is how they arrange themselves in syllables.[13]

Without doubt, "the elementary pattern underlying any grouping of phonemes is the syllable."[96]

Second, it follows that every language will have the unit, syllable. While "the elements of structure in the syllable may be simply the places where consonant and vowel phonemes occur,"[116A] each language permits only certain combinations of consonant and vowel phonemes. Out of the almost infinite number of sound combinations English speakers could employ to begin and end single-vowel words and syllables, only a relatively few are used. We shall see in the description of the distributional theory of syllabication given later in this monograph how these sound combinations in English can be analyzed as one conceivable basis for determining the limits or boundaries of syllables.

We know too, that certain combinations of sounds, not used by speakers of English, are not avoided because they are hard to say or confusing to hear, "English speakers have no trouble with initial clusters like /vl/ and /sp/--we can easily say Vladimir, and He shpilled his drink is not unknown when under the influence; but they are not put to any use worth mentioning."[13] Yet, "no rules can be set up to determine the use that is made of possibilities offered by the linguistic structure; whether a given possibility is used or rejected is a matter of pure chance."[90] Why no speaker uses all the combinations that would be possible with the sounds in his language is completely unknown.

Third, it is agreed in linguistics that English is a stressed-timed language, a condition of speech not universally seen in language. For example, in Estonian the first syllable in a word is always stressed.[111] The stressed syllables in English are not supposed to occur faster than at a certain maximum rate. Accordingly, after a heavy stress a certain minimum time would have to elapse before the next heavy stress occurred. How long this time-elapse is, should be, or has to be, is not known precisely. It becomes clear that:

> ...it is a necessary consequence of the fact that English is a language which is spoken with a stress-timed rhythm that its syllables are of uneven length.[2]
>
> American speech is characterized by a strong rhythm pattern in which stressed syllables alternate more or less regularly with unstressed syllables. The relative difference in force between stressed and unstressed syllable is considerably greater in English than in any other language. This means that in order to speak English naturally, one's unstressed sounds must have very little stress indeed.[24]

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This stress-timed factor also accounts for the use of the schwa vowel (ə) in English (alone, the, easily, of, circus):

> The (ə) is neutral because there is no truly standard tongue position typical for it. It is unstressed because it is pronounced with the least energy of any of the vowels, and tends to be lower in pitch and shorter in duration. It is indefinite or obscure because it has little in the way of identifiable vowel quality of its own; it is a kind of 'vocal murmur,' a name by which it has sometimes been known. [24]

Chapter III will describe how the schwa sound complicates the application of a closed-syllable (VC) division of this phenomenon. The child learning to read with any approach to the use of syllabication will have to "soon be able to recognize in the speech around him innumerable instances where (ə) is used instead of the definite vowel suggested by the spelling." [24] What is important, however, is the generally-held view among linguists that speech consists of a series of syllabic pulses whose timing and stress are not predictable to any great degree.

Fourth, linguists do not see speech as a succession of discrete units: "We do not finish pronouncing one syllable and then retire to regroup for an assault on the next one." [116A] While it is conceded that every language has the identifiable unit, the syllable, there has been evidence "that sounds of separate syllables imperceptively glide and blend with one another." [137] It is quite normal, then, to expect speakers of English to slur unaccented syllables and to concentrate their vocal power on stressed syllables. We can visualize some children being admonished for saying pōme for poem. A teacher may insist on po-em or po-im, not realizing that about as close as the general speaker will go, because of the gliding and blending nature of speech, is po-əm. Complicating this is the fact that no two speech sounds which are the same are ever said exactly

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alike by the speaker "because the physical act of articulation cannot be exactly repeated either by the same speaker or by different speakers."[133] Nevertheless, speakers of the same language are able to imitate and recognize these sounds within a fixed scale of tolerance so that the sounds are identifiable.

Fifth, the idea of checked-vowel "closed," and free-vowel "open" syllables seems widely accepted:

> English vowels are short in closed syllables before voiceless stops, as in hit, hat, hot; longer in closed syllables before voiced stops, before voiceless aspirants, and in open syllables, as in hid, had, hod, hiss, pass, moss, or tabu and hurrah; and longest before voiced spirants as in his, has, and badge.[44]

> ...the syllable is said to be closed when it ends in a vowel sound.[129]

Also, vowels in the free or open position at the end of a syllable tend to have greater sonority and duration, if not loudness, than vowels in the checked or closed position followed by a consonant in the same syllable. This difference comes easily for native speakers and is therefore basic to the acquisition of a dialect.

Sixth, vowels in syllables are seen to have different acoustical values depending on the position in the syllable they occupy. Most of the common vowels have been "found to be significantly different from each other in mean relative intensity."[55] Fairbanks, for example, was able to rank the indicated vowel sounds in the following words from the highest intensity (in the decibels indicated in parenthesis) to the lowest intensity: cap (4.5), talk (3.8), shop (3.7), choke (3.0), check (2.2), coop (1.9), cup (1.1), cheek (1.0), cook (.3), and pit (0.0). Approximately (4.5) decibels is five times as much intensity or loudness as (0.0) decibels. These differences are relatively easy for us to hear since "the ear can resolve variations smaller than one CPS cycle per second in the fundamental frequency of vowel-like sounds."[111] Evidence of the relative vowel intensity conflicts with any notion that the vowels in cap and pit are of identical quality.

Seventh, it is generally agreed that syllables have a peculiar internal structure, usually called a nucleus, which forms the syllabic of the syllable. The syllabic is defined as the sound (usually vowel) that constitutes the major element of the syllable. The major element has the greatest amount of stress, sonority, prominence, duration, tone, force, quantity, pitch, and loudness; all words which nonlinguists have ways of interpreting. More precisely, "the pivotal principle of syllable structure is the contrast of successive features within the syllable." "It is mainly the contrast vowel versus consonant which is used to render one part of the syllable more prominent."[96] The "crest" phonemes that form the syllabic or nucleus of the syllable have prosodic features, while the satellite or "slope" phonemes (usually consonants) that come before and/or after the nucleus are characterized by a deduction of acoustical energy. For this reason, while prosodic properties are generally found with respect to vowels, they do not belong to vowels, they belong to syllables: "Prosodic properties... must be considered properties of a specific portion of the syllable."[161]

Eighth, it is recognized that each individual syllable (a) may have one vowel sound, (b) may have more than one vowel sound, and (c) may not have a vowel sound. The category (a) is readily recognized in the word hat. Syllables also have diphthongs, vowel sounds which are composed of two sound elements (boil): "A diphthong can be analyzed as a combination of a vowel with a semivowel (a nonsyllabic glide, like the y in yes), and this analysis is in fact adopted by many linguists, [see 29] especially Americans."[9] The diphthong forms only one syllable because it forms only one peak of acoustic energy. As Hughes noted, the sonority of the vowels /i/ and /u/ can be reduced by "drastically abbreviating their duration, to the point where adjacent to other vowels in a sequence, they may function as consonants. This produces the phenomenon noted as the diphthong."[94]

Finally, we see that "the phonemes /l/, /m/, and /n/ may be syllabic in modern English."[59] These nonvowel sounds, which can be syllabic, "have some of the important characteristics of vowels but are not conventionally classified as such."[24] Therefore, "the old notion that a syllable was a vowel or a combination of a vowel and one or more consonants will not really do. In a word like 'rhythm' there are recognizably two syllables, but the second of them need not have a vowel."[20] Thus, "in English resonant consonants can form syllables."[9] These, "syllabic consonants occur most frequently when two successive easily linked consonants in adjacent syllables are homorganic. Homorganic consonants are those which have identical places of articulation."[110] You may demonstrate this by placing your tongue in the position to say /l/, and then say /p/. Note that the tongue does not change its position.

Boundaries of the Syllable Are Difficult to Measure

While the syllable is considered the basic acoustic and physiologic element of speech (in contrast to phonemes, the basic units of language) the boundaries of syllables are difficult to determine. Whether as Hughes claimed, there are "no physical boundaries" between syllables,[94] or whether the "brief intervals of relative silence" that both precede and follow syllables can be considered as such;[24] will be explored in the discussion that follows. We will also see whether the pauses that define the boundaries of the syllable are there to allow a breath to be taken, or to clarify the words being spoken.

First, we should note linguists believe that while "it is perfectly easy to identify the number of syllables in a given utterance, it is not so easy to establish boundaries between syllables."[77] As Jones said: "we know how many syllables there are in a word by counting the peaks of prominence, but we cannot define with precision the points at which syllables begin and end."[97] This may happen because the syllable is "too large and complex a unit to serve the purposes of general phonetic description adequately."[1] Whatever the reason, "the determination of where one syllable ends and the next begins is not always easy."[116] For example, "phonetically it is often hard to decide to which syllable an intervocalic consonant belongs."[136]

The syllable presents a problem similar to that of a cartographer deciding exactly how much of the valley between two hills belongs to each hill. Because of the general uncertainty that surrounds this matter, electronic devices or acoustical recorders have been used to measure the "peaks" of acoustical energy which tends to correspond to the enunciation of sounds phoneticians call syllables. Unfortunately, even the acoustical recorder does not tell precisely where one syllable ends and another beings. This leads some to conclude that "attempts to define the syllable by the investigation of acoustic records of utterances have been unsuccessful, and instrumental phoneticians have denied the reality of the syllable."[84] Others, more optimistic have contended that "these questions still await final answers from the experiments of acoustic phoneticians."[94]

But pessimism persists in the arguments of Eliason, who believed that when a vowel is short and followed by a consonant, which in turn is followed by another vowel (VCV), "there is no evident point where one syllable ends and the next begins. Thus, short vowel sound groups can only be divided into syllables arbitrarily." Therefore, "the question of where the syllable boundary must occur in dissyllables containing a single intervocalic consonant (VCV) is controversial at best." A good example is the word hitting, in which the "consonant is ambisyllabic," and "the division occurs, if at all, within the consonant itself."[53]

It is not surprising then, that many of the traditional dictionary definitions of syllables have been rejected by the students of language or phonetics. In place of this are phonetic, visual, morphological, typographical, and even acoustical definitions. This difficulty arose because "there are few clues in the physical process (of speaking) to indicate how this continuous stream of sound is to be segmented:"[119]

> Whatever units do exist, they are not perceived as units, any more than one perceives the individual frames of a motion picture when one goes to the cinema." "Some speech analysts go so far as to say that it is highly unlikely that one ever makes exactly the same group of speech movements twice in a lifetime; and if one does, it is to be attributed to chance rather than to law.[113]

This raises questions about the belief that what perceptual organization we can impose upon speech seems to be the product of "discrimination learning." If "we are reinforced by parents and teachers for discriminating among some aspects of the speech stream, and we are not reinforced for other discriminations,"[119] this process surely has not been adequately described. Nor does it explain the voluntary practice of saying "syllables" by very young children.

This sampling of learned comments on the difficult nature of determining the limits of syllables gives reinforcement to Hall's observation that "the syllable is perhaps the most extensively discussed of phonetic phenomena, and at the same time that on which there is the least agreement among phoneticians." 77 There remains for some linguists no satisfactory theory of how the syllable is produced or how it is perceived. 1 Some say the disputes over syllabication seem "irresolvable, because the facts of our pronunciation (of which spelling is only a reflection) afford us no basis on which to found our orthographic divisions." 77 It is important to know what these controversies are, because if reasonable decisions about the role of syllabication in teaching word analysis must be made, they will have to be made on what positive things we can conclude from these disputes.

Conflicting Theories of the Syllable

A. There are several ways the syllable has been described or explained. One of these is on the basis of its characteristic of *stress*, or "the relative increase in energy during the pronunciation of the word or syllable." Stress "represents the relative prominence of syllables within the word." 155 Syllables exhibit contrasting features of stress. They are relatively louder or longer, with different pitch movements--falling and rising. 78 "Differences in stress are, of course, relative yet distinctive enough to be noticed by any native speaker of English." 18

Wallword stated that, "technically it is not easy to describe stress," and yet:

> practically few native English speakers have difficulty in at least recognizing it when they hear it; so that for instance they can tell you that in 'forget' the second syllable is stressed and in 'later' the first syllable is stressed. If asked to say how they know, most people will say that the relevant syllable is 'louder' than the other.[166]

Technically speaking we know there are three or four recognized degrees of stress in syllables: main, secondary, absence of stress;[114] or primary, secondary, tertiary, and weak.[28] Stress, very simply, involves four levels or degrees of loudness (it also involves pitch, quality, and duration of sound): (a) The word milk illustrates one level. (b) Some syllables are stressed more strongly than others. In coffee the first syllable has a stronger stress than the second syllable. (c) Between the strong stress in milk and in the first syllable of coffee (coff), and the weak stress of the second syllable of coffee (ee); is another level of stress. The first syllable of grapefruit is strong and its second syllable is stronger than the ee part of coffee. And, (d) "consider what we say when we say check-out counter, especially the -out part. It is weaker than both the check- part and the count- part. But it is stronger than the -er part."[28] These stresses in the rank order of their loudness are called primary stress, secondary stress, tertiary stress and weak stress. Also seen are four kinds of levels: crescendo, diminuendo, crescendo-diminuendo and diminuendo-crescendo.[97] Crystal and Quirk saw even more levels for prominence (prominence described below): pianissimo, piano, forte, fortissimo, crescendo and diminuendo.[35]

We also know that by various devices such as prolonging a vowel sound, saying it more loudly, and raising its pitch; one can vary the degree of emphasis given a syllable when giving a peculiar meaning to a statement. Notice how the meaning of the question Is Bill coming today? changes when the emphasis is changed from Bill to today. [13] This is further illustrated in the following:

> The syllable is the field of action for the three most important ways in which the sound of words is intentionally modified. The first of these is accent: when we say 'The word reverberate is accented in this sentence' we mean, as far as physical sound is concerned, that just the syllable -ver- is accented. The second is expressive length: to make the word awful more emphatic we drawl just the first syllable, the accented one. The third is the rise and fall of pitch: normally, a marked change in the direction of the pitch curve coincides with beginning of a syllable--Do you have to spend your money so carelessly? shows pitch rise on have, mon-, care-, and -ly. [13]

All this confirms the idea that "a monosyllabic word has in English no word accent," and that nouns, verbs, adjectives, and adverbs get the stress in sentences. [114] Wallwork called these devices the "basic tunes of English," and he believes he can detect six different ones. [166]

We learn too, that a "vowel in the free position, at the end of a syllable, tends to have greater prominence, sonority and duration, than one in the checked position (followed by a consonant in the same syllable)." [129] It has also been noted in this discussion why speakers tend to slur unaccented syllables (to make the schwa sound) and concentrate their vocal power on the stressed syllable, which is generally the first syllable in polysyllabic words. [120]

The distinction that is made between prominence and stress or intonation is also important in this discussion. Daniel Jones, [97] who emphasized stress as the distinctive feature of the syllable, believed that stress is not the same as prominence since prominence is the combined effect of timbre or tambre, length, stress, intonation, and tone contours of the syllabic sound. * (Tone contours refer to the rising and falling intonation seen in strings of syllables, typically sentences, described above.) Tambre, Jones said, is the inherent quality of the phoneme. For example, "the prominence of the English short a quality so outweights that of the sort i that it is well-nigh impossible to render an i more prominent by stress alone."[97] If prominence can be seen as perceived loudness then it follows that it includes the duration, the frequency and the amplitude of the syllable sound, all of which become cues to the perception of stressed syllables. In fact, some acoustics experiments suggest that stress and pitch are the same thing since stressed syllables always have a higher pitch.[94]

The complicated description generally given to stress makes credible Daniel Jones' remark that "it is often difficult, if not impossible to compare objectively by ear the stress of one syllable with that of another" for "sound pronounced with strong stress is often less loud than another sound pronounced by weaker stress." Therefore, "one often cannot say for certain how much of the prominence is to be attributed to stress."[97]

There also appears to be disagreement as to whether the stress or prominence theory can be used to determine syllable boundaries. The break or pause that signifies syllable division "seems to be heard each time we pronounce two strong stresses next to each other; the break separating the two

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*Syllabic sound is the crest sound of the syllable.

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primary stresses in the three levels of the stress system, or two primaries, or a primary and secondary in the system containing four levels of stress,"[18] according to Bronstein.

Some linguists disagree with the prominence theory, in which "syllable boundaries occur at the points of relatively weak prominence."[69] It is a theory based mainly on auditory judgments, which does not, according to Gimson, "determine to which syllable the weak sound, constituting the boundary between two syllables, is to be attributed."[69]

Moreover, it is said "the length and loudness of each syllable is affected by the number of syllables in the foot (unit of rhythm) and by their relative importance."[113] The vowel sound in good is longer than in goodness. The volume of loudness of -bout in these sentences grows increasingly stronger: He was walking about; What's he talking about? It's about a mile. Therefore the "stress" syllable is named as a "phonemic" syllable.[127] According to this idea, "English utterances may be considered as being divided by the isochronous beat of the stress pulse into feet of (approximately) even length:"[2] This is the/ house that/ Jack/ built, has four feet. Consequently, "the quality of any syllable is the proportion of the total length of the foot within which the syllable occurs, and is relative to the quantity of any other syllable in the foot." Abercrombie, predictably, believed that syllable quality is not "directly dependent" upon vowel quantity or stress.

Syllable separation based on the stress principle also depends on the understanding of the idea of allophones in language. While a phoneme is a distinctive sound that distinquishes one word from another: cap - cat; the p in *up* and *pale* are allophones. A different stress is put here on the two allophones of the phoneme *p*. The reason we hear the syllable division in *shyness* and *sinus* is because of the allophone of *n*.[98] Daniel Jones illustrated this with *plate rack* and *play track:* these "are quite distinct in spite of the fact that they are made up of the same phonemes. They are said with different allophones of the phonemes t and r, namely those which would be used if the constituent words were said in isolation."[98] In *plate rack* the *t* is weak and the *r* is fully voiced. In *play track* the *t* is strongly articulated and the *r* is voiceless. This allophonic distinction can also be heard in words like *toe strap/toast rack.*

Such thinking has led to what has been called the *juncture* notion of syllabication.[18] While "internal open juncture is easier and simpler to hear than describe,"[112] it appears that in open juncture the syllabic division is between two strong stresses when "the stream of speech ceases before a pause,"[77] and/or when it is needed for meaning: *nitrate*--*night*-*rate*--*Nye*-*trait.* (This illustrates how syllabication is necessary for us to distinguish *It's an aim* from *It's a name*, or *Send them aid* from *Send the maid.*) *Close juncture* is said to occur between two syllables when a stressed vowel is followed by an unstressed vowel "without any interruption or other type of special transition,"[77] e.g., *seeing*. Juncture phonemes give English its characteristic intonation that helps make it unique from other languages. A juncture idea is relatively new, as Bloch and Trager pointed out in 1942, when they noted that "juncture phenomena have as yet been little studied and...no general theory or plan of classification has been worked out."[11]

Other linguists emphasize the distinguishing characteristic of the syllable as its sonority instead of its stress. Accordingly, a syllable is a "sequence of speech sounds having a maximum or peak of inherent sonority...between two minima of sonority."[136] A syllable is "the stretch of speech sound between two troughs of sonority."[76] Therefore, it is sonority, then on which acoustically syllabification may depend, for the syllable ends where it reaches a minimum of sonority."[52] Sonority is further explained in the following passages:

> If there are two, three, or more sounds which stand out more prominently than their immediate neighbors, the sequence is said to consist of two, three, or more syllables, "and" the reason why certain sounds are prominent in words or sentences generally is that they are adjacent to less sonorous sounds.[98]

> A syllable is simply a peak of sonority with certain sounds grouped around it.[94]

Sonority is not simply stress or voice pitch. For a sound to be more sonorous means it has "greater carrying power." "Sonority varies with the degree of openness of the vocal tract...," or lack of obstruction of the air passage in articulation.[136] So, "sonority...is determined by the size of the resonance chamber through which the air stream flows."[11] Thus vowels are more sonorous than consonants, and when a vowel is uttered alone or with one or more consonants it is always syllabic. Two vowels uttered together without a break between them each may be syllabic if each is pronounced with a separate impulse or stress. Open or free vowels (bee) are more sonorous than closed or checked vowels (bed). (An open vowel is made when the tongue is held as high as possible without a perceptible frictional voice.) Voiced nasal /m/ and lateral /l/ consonants are more sonorous than other voiced consonants such as /d/.

Sonorous sounds are those, then, that are not stopped or hindered. But "when in speech the breath comes through the mouth with some rubbing, hissing, clicking, trilling or stoppage, done with the action of the tongue against, or nearly against, the linings or the teeth or the lips which make up the mouth passage; then this rubbing or stoppage is called consonantal;" [142] and has a loss of sonority. Sonority, or the "seeming fullness or largeness" of sound, when recorded on an acoustical recorder has been shown to give much the same results as those heard through aural observation. It has been shown that consonants (except l-r-m-n) "are less prominent acoustically than the vowels that occur with them." [84] M-n-l-r, ordinarily considered consonants, may form syllables without an accompanying vowel. [103]

It has been argued that the principle of sonority does not define the divisions between, or boundaries of syllables since it can be said that a consonant between two vowels "belongs to the syllables of both in that its onset comes before the end of the first syllable... involved." [77] Moreover, Kurath's idea that the syllable boundary is "at the point of least sonority;" [106] rather than the consonant that separates vowels, seems of little precise help with this matter.

B. Other phoneticians have tried to distinguish syllables acoustically through the use of recording devices. While modest in their claims for success in this: "we can only guess that speech may possibly be analyzed into segments and layers in the perception aspect," [102] acoustic phoneticians are convinced that sonority or prominence cannot be converted into an acoustically meaningful statement. They assert that the only field for accurate study can be an acoustical one where the basis for differences within the syllable is sound in the spectrum as shown on the spectrogram. Acoustical analysis is consequently, a more technical and intricate endeavor than other ways of determining syllables. The acoustician would say: "the spectrum of the vowel as it exists in the open air is to be reckoned with, then, as the glottal spectrum multiplied by each frequency of the transmission percentage of the articulatory filter;" or "the speech wave is the weight sum of a series of sinusoidal waves." Such statements are admittedly poorly understood--even by general linguists.

According to Joos (who claimed to be the first linguist to use the spectrograph) it was not until "early in World War II" that "Bell Telephone Laboratories had perfected the sound spectrograph."[89] The spectrograph is an instrument that makes a recording on special paper, in roughly the same dimensions as printed music. This recording is a record of the intensities of sound at all instants of time and all the levels of frequency. Since "intentions are easily read off from spectrograms" the "valleys" or lowest points of intonation between crests of intonation can be read off the spectrogram as the divisions or dividing points between syllables.[102]

C. A third group of linguists pose another theory of syllabication that maintains that a "completely objective definition of the syllable has never been achieved...perhaps because of the failure to recognize that this unit is of a physiological nature instead of an acoustic or linguistic one. A physiological correlate of the syllable may be what Stetson called the breath pulse."[109] The explanation of the syllable, they contend, is to be found in the physiology of the respiratory muscles that "alternatively contract and relax at a rate of roughly five [others say six[109]] times per second, so that air is expelled in a succession of small puffs. Each contraction, together with the resulting puff of air, constitutes the basis of a syllable."[127] Hence the name "phonetic" syllable,[127] for "the syllable is essentially a movement of the speech organs, and not a characteristic of the sound of speech."[1]

The proponents of this theory define the syllable as a single unit of movement of the lung initiator which includes but one crest of speed. Thus, the "trough" of the syllable, the point where one divides into another "tends to come at the region of heaviest air pressure."[132] A syllable produced by a reinforced chest-pulse is called a stressed syllable. That the syllable movement "is not necessarily always accompanied by a sound..." is shown in kyou for thank you, which indicates the first movement, thang, is auditorially missing.[1]

We see, then, that the theory of the syllable founded upon the articulatory act has been attacked. The defenders of the physiological theory do not deny the idea that there are releasing consonants, (the ones that start the syllable movement) and arresting consonants (the ones that stop the syllable movement). But they also contend that since "the stroke of the expiratory chest muscles and the best stroke of the consonant occur at the same time,"[120] the syllable division is best defined by physiological movement." This theory suggests that the syllable rather than the sound is the basic unit of speech."[69]

Jacobson and Halle stated that "the motor correlate of the phonemic syllable has been most adequately described by Stetson as a 'puff of air forced upward through the vocal channel by a compression of the intercostal muscles.'"[114] Lenneberg agreed with Stetson's analysis:[154]

> A physiological correlate of the syllable may be what Stetson called the breath pulse. If the contraction of the thorax during speech is graphically recorded, we may occasionally see trains of little steps on the downward (expiratory) slope of the curve. Frequently our perceptual impression of syllable boundaries is synchronous with these steps. The reason for this is clear: many syllables have a vowel-core delimited by consonants or silence, and most consonants either retard or stop the flow of air and are thus obstacles to the smooth contraction of the thoracic wall. [109]

Every syllable, then, consists of three successive features: release, culmination, and arrest of the chest pulse. One should be able to determine the limits of a syllable by deciding when the action of the chest muscle has terminated and before it initiates another puff of air.

Other linguists, who agree that the syllable is the smallest unit of speech that can be produced on a single breath group when polysyllabic words are considered, would disagree with Stetson's description. Stetson saw a perfect correspondence between innervation of the respiratory muscles and the sonorous intensity of sounds. He believed that sonorous intensity increased and decreased in a parallel way with the variation of the respiratory muscles. [115] Lieberman contends that "Stetson's physiologic model [the chest is similar to a hand bellows] is unfortunately erroneous." Lieberman claimed Stetson was wrong "since the elastic recoil force of the lungs actively reduces the volume of the lungs during expiration." [111]

Yet other groups argue "that the apparent arresting movements of the chest muscles are the result of syllabic divisions rather than cause." [24] Consequently, Stetson's claim that he could study the movement of speech without regard to its linguistic function, so as to construct a consistent physiological model for the production of the suprasegmentals (roughly, intonations) of speech, is cast into doubt. It may be that this is not entirely possible, as Pulgram suggested: "neither pure physicalism nor intransigent relationalism can provide all the answers we need to know about language,... rather, the physical and the cultural aspects of language must be treated jointly."[133]

D. Another theory of syllabication is endorsed by linguists who discuss the syllable in terms of the distributional features of the phonemes* in the language. This group says that a syllabic division of polysyllabic words should rest on the possible combinations of sound one can find in monosyllabic words. As Hughes put it, in the distributional theory, "one assumes that sequences of sounds that occur at the beginning of a word can occur at the beginning of a syllable, and that those which can occur finally in a word can occur finally within a syllable."[94] McIntosh and Halliday agreed that "the elements of structure in the syllable may be simply the places where consonant and vowel phonemes occur, say C and V."[116A] This theory seems a relatively old one. Sapir said of the syllable in 1921: "most important of all, perhaps, are the very different possibilities of combining phonetic elements."[143]

To explain this theory we should note that English makes use of only a limited number of possible combinations of its phonemes, although it is at the top of the scale of languages that permit the greatest degree of syllabic complexity.[136] That there are a large number of syllables in English seems to be agreed upon. But linguists disagree about the exact number. Denes and Pinson said we have "one or two thousand."[43]

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*It should be stressed at the outset that all the discussion to follow refers to sounds or phonemes, and not to spellings. Thus bullet is seen as CVCVC (not CVCCVC) for the purposes of the analyses described. Permit would be CVCCVC.

The limited number of combinations is illustrated in an English word by the absence of an initial consonant group of four consonant sounds. No word in English begins with *ng* or *mt* sounds, or the *zh* sound in *azure*. The sound of *h* as in *him* is never used in the middle of a single syllable word.[113] The vowel sounds in *bit*, *bet*, *bat*, *hot*, *hut* and *foot* never end a word,[106] and "...at the end of stressed words or syllables only 'long' vowels and 'diphthongs' are admissible."[160] Also, "English is partial to syllables that end in consonant sounds."[128]

A syllable division theory based on such distributional principles states that somewhere in the sequence of sounds (phonemes) between every two consecutive vowels there is a dividing point. This point is predictable when one is given the phonemes in this sequence, and a knowledge of their permissible distribution in the rest of the language. Given the permitted or allowed sequences of vowel and consonant clusters in monosyllabic words there is only one place the syllable division could be made.[104] Therefore, the following vowel (V) and consonant (C) divisions are said to be predictable since it is judged that we do not have other such combinations in initial and final clusters in monosyllabic words: VC-CV (where the consonants are the same), CV-VC (not a diphthong), and V-ing.[104] The distribution of V-CV rather than VC-V is made on distributional grounds because in all languages CV is a more common sequence than VC. Further, "...in a word stressed on a noninitial syllable, in stress-marked languages [English is one], the stressed articulation usually begins on the consonant in such sequences."[136] This is absolute in some languages. Arabic, for example, does not allow any syllables not beginning with a consonant.[136]

It is desirable, then, to set up a simple rule that a single letter (between syllable markers) other than X goes with the second marker in all cases."[116] This and other evidence which follows, leads some linguists to insist that the distributional theory, or "syllable division" theory, "provides the most convenient description of segmental grouping within phases."[104]

The distributional theory is explained by Hjelmslev[90] as a "contract" between vowel and consonant elements. The syllable according to this theory is described as:

> ...a *unit of elements* resulting from the fact that certain elements contract relation with one another. The structure of the syllable depends on the relations that can be contracted by the elements--relations governed by special rules for each element or each category of elements.... Vowels each have the property of being able to form a syllable by themselves, while consonants do not. Vowels and consonants may contract relation with one another within a syllable, or combine to form a syllable. But there are certain restrictions on relations between vowel and vowel, and between consonant and consonant, within one and the same syllable. Not every element can be connected with every other, but only some with some. And the rules governing relations may be such that, for example, certain consonants may be combined in a certain order but not in all conceivable orders: an English syllable may end in *-pt* but not in *-tp*." "The chains *pat*, *sat*, *rat*, etc., ...are possible signs since they are possible syllables, but possible syllables can be found, like *pid* or *maf*, that are not signs in English. They are unused sign-possibilities, and the fact that they are not used, while certain others are, is pure accident. Moreover, we are free to use them any moment we wish. We can decide tomorrow to introduce an English word *pid* or *maf* with some meaning or another, and we can do so because they are possible syllables--the elements entering into them are given the possibility, in the linguistic structure, of occupying these places.[90]

One of the more exacting analyses based on the distributional theory of syllabication was done by Soderberg.[148] He claimed that within the limits of permitted combinations in monosyllabic words (the phonemic "equilibrium" of the language):

> ...the hypothesis that a consonant between two vowels always belongs to the following syllable and that the existence of final consonant in the preceding syllable presupposes the existence of an initial consonant in the following syllable is sustained." "Syllable division may be regarded as a means of bringing about or emphasizing that equilibrium." "The syllable may be considered an expression of the inherent tendency of language towards phonemic equilibrium. 148

A disturbance in the state of equilibrium is eliminated by restabilizing the movement based on consonant combinations that are permitted in English monosyllables. Soderberg found these syllabications to yield the best phonemic equilibrium: VC-CCV, VCC-CCV, V-CV-CV, VC-CV-CVC, V-CV and VC-CV. His research did not allow him to say anything definite about VCCCV or VCCCCV, however. The distributional theory investigated by Soderberg would seem to lend itself most directly to language-data processing by computers. It will probably be on this theory that "a perception mechanism can acquire the capability of recognizing both the boundaries and the characteristic features of the phonetic structures of normal speech." 65

Another important study in which the results involved the distributional theory of syllabication was that of O'Connor and Trim. 123 These researchers contended that accentuation (roughly stress and intonation) "may tell us about syllabics--but not, we believe, about syllables." (Syllabic: the sound with the maximum degree of sonority, stress or intonation in a syllable; Syllable: "a minimal pattern of phoneme combination with a vowel unit as nucleus, preceded and followed by a consonant unit or permitted consonant combination.") 123

It would follow, then, in O'Connor and Trim's logic that "the relative frequency of occurrence of various syllable-initial and syllable-final consonant combinations" in one-vowel words furnishes a basis for determining the point of syllable division. "The syllable is thus established irrespective of accentual features, though it may subsequently be useful to relate the two together."[123]

O'Connor and Trim believed that the analysis of their one-vowel words would show that "the preference for one syllabic division as opposed to another may be explained in terms of the frequency of occurrence of different types of syllable finals and initials."[123] For the total of the one-vowel words they studied they found these combinations of consonant (C) and vowel (V) occurring with the following frequencies at the beginnings or endings of one-vowel words:

	Beginning of word	End of word	Total
CV	421	276	697
VC	209	277	486
CC	26*	59*	85
VV	10	22	32
V (single letter word)	12		12

It is clear from this analysis that CV is more frequent initially and finally in one-vowel words than all the other combinations combined. It can be seen that VC occurs more at the end of words than CV, however. And, CC and VV are relatively rare occurrences at the beginning and the end of one-vowel words.

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*This is in conflict with Moses[120] who claims that over forty initial and more than eighty final clusters of two consonantal phonemes are found in monosyllabic words.

The results of their analysis presented above[123] led O'Connor and Trim to argue for a preference for certain syllable divisions over others. For example, the polysyllabic word relay could conceivably be divided VC-V or V-CV. According to the above data the relative probabilities for these two word divisions would be 289 (277 + 12) to 433 (12 + 421). Therefore V-CV is the preferable division. The word, postal, could be divided V-CCV, VC-CV, or VCC-V. The relative probabilities for these three divisions are 38 to 698 to 71: (12 + 26), (277 + 421), (59 + 12). Clearly, the probability for the division VC-CV is outstanding.

Although it may take some years to develop, as adults at least, we can exercise judgment that follows the above analytical data regarding how syllables begin. This judgment, "based on a life-long unconscious statistical discussion of speech material,"[123] was tested by Brown and Hildum.[19] They gave college students ten sets of "syllable-triplets," where each of the three syllables in a set had the same vowel and final consonant but the three used different initial consonant clusters. One syllable began with an initial cluster that resulted in an English word, one began with a cluster possible in an initial position but which did not yield a word, and a third began with a cluster that does not occur in the initial position in words. Brown and Hildum found that "when the speech includes an initial consonant cluster that never occurs in that position in the native language ... nearly everyone fails to identify the cluster correctly" (spell the word so as to make the pronunciation clear). Consequently, "when a given phoneme or cluster of phonemes is very improbable, the presented stimulus is unlikely to register accurately with anyone."[19]

Investigations of the dictionary syllabication of words found in basal reading textbooks cannot be compared to the data of Soderberg or that of O'Connor and Trim.

Clymer, for example, found that according to the dictionary, 44 percent of words at the primary grade level that had VCV clusters were syllabicated by the dictionary V-CV, while 72 percent of the words in dictionaries with VCCV clusters were divided VC-CV.[30] Emans, researching words beyond the primary grades, found these percentages grew to 84 and 96 percent, respectively.[54] Bailey, whose study included all of the words in the reading texts used in grades one through six she studied, calculated these percentages to be 50 and 78.[8] These latter studies by educationists analyzed the *spelling patterns* of words to determine syllable boundaries, rather than the patterns of occurrence of phonemes in words. Too, whatever value there is in the evidence given by Clymer, Emans, and Bailey, it rests entirely upon the acceptance of dictionary syllabication as the legitimate guide to this division of words. We have demonstrated that linguists do not accept this dictionary division as a true picture of syllabication. Therefore, if one accepts the findings of linguistics as to the nature of the syllable, one must dismiss much of the evidence from Clymer and the others as irrelevant to the problem posed by this monograph.*

E. Acceptance of some of the evidence given by Clymer and others (Bailey and Emans) is impossible because there is no theory in linguistic literature to our knowledge that supports *dictionary syllabication* as a system by which boundaries of the syllable should be defined. Apparent from a review of the literature in linguistics is the absence of any defense for basing a definition

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*Clymer also supports other notions about phonemics that linguists would dispute. For example, he thinks that the *ui* in words like *suit* represent the long *u*, /ju/, sound, and that "w is sometimes a vowel."[30]

of the syllable on how the dictionary carries out the syllabication of its entries. Nowhere has there been an agreement that the system of syllabication for entry words used by the dictionary has any theoretical framework in linguistics, or is based on any systematic analysis of oral language. Whenever dictionary syllabication is discussed in linguistics it is generally in agreement with the comments of Carrell and Tiffany, and Wardhaugh respectively:

> Dictionaries in widest use list only the formal, literary pronunciation, or, more properly, the *lexical* pronunciation. This is the way the word is pronounced when it is spoken carefully by itself, rather than in connected speech. This is useful information, but it is perfectly clear that when words are joined in expressive, communicative utterance they are not necessarily spoken in this way. Speech would indeed sound odd if they were.[24]

> [Dictionary rules for syllabication] . . . have almost nothing to do with the actual sound pattern of English and almost everything to do with line-breaking conventions, and have hardly any possible application beyond the typesetter's domain.[167]

Webster's Third New International Dictionary (Merriam, 1961), the unabridged dictionary, comments that "divisions avoided by publishers are sometimes printed in dictionaries probably as a concession to those who believe that syllabic division is a guide to pronunciation. However, it is the pronunciation of a word that governs its orthographic division rather than the other way around." Nonetheless, it is obvious from the arbitrary decisions this dictionary makes regarding syllabication that its scheme of the syllable is not based on any of the theories that have been previously described. Another large dictionary, the *Random House Dictionary of the English Language* (1967), makes no such pretense about the importance of speech, admitting that:

> Words are syllabified in this dictionary according to the usual American principles of word division, as observed, with certain modifications, in printing and typing." "Since syllable divisions for the spelled entry word and syllable divisions in the pronunciation parentheses are determined by entirely different sets of rules, they will not necessarily correspond in number or placement.

The conclusion one must draw from all this is that to use dictionary syllabication as the basis for teaching about the properties of the English syllable has no support from modern linguistics, or even, for that matter, from dictionaries themselves.

Evidence from Linguistics versus Advice from Educationists

Before leaving this description of the syllable, the disturbing remarks that have been made on the nature and the teaching of syllabication by educationists should be emphasized. In Chapter I we noted that the majority of the educationists who were cited regarding the teaching of dictionary syllabication to children, as an aid to their learning to read and spell, were in favor of this practice for this purpose. A conflict between these statements and the evidence gathered from the literature on linguistics is immediately apparent. No theory of syllabication forwarded in linguistics supports dictionary syllabication as an accurate or complete description of the properties and boundaries of the syllable. As previously stated, any discussion of dictionary syllabication in linguistics is conspicuously absent.

Much of the advice given to teachers by the educationists who support the dictionary syllabication system is contradicted by the evidence from the science of language. Educationists write about phonics; linguists write about phonetics, phonology, and phonemics. It is claimed by educationists that phonics is a selective explanation of the above linguistic information to teachers so that they can use this information to help pupils learn to read and spell. The question raised by the contrast of information found in linguistics with that presented as phonics is clear: Do the educationists writing about phonics know phonetics, phonemics, and phonology well enough to explain these subjects to teachers without distorting or misconstruing the facts? And particularly for our interests in this present discussion: Do the educationists writing about phonics give an accurate description of the syllable? One linguist, familiar with writings in phonics, answers these questions in the negative as he notes that "an examination of almost any writing on phonics will reveal examples of misconception."[167]

There seem to be many statements on phonics made by educationists that would support this conclusion. The following is a sampling of these, a sampling that could be easily enlarged. Heilman wrote: "Consonant blends consist of two or more letters which are blended into a single speech sound."[86] We know from linguistics that letters Heilman calls consonant "blends" do not blend to make sounds. These supposed blends e.g., (*cl*-*br*) do not glide into each other to any peculiar degree as, for example, do the glide consonants y and w into the vowel sounds in *yet* and *wet*. Statements given by others: "In many two- and three-syllable words, the final *e* lengthens the vowel in the last syllable;" or "In *ay* the *y* is silent and gives *a* its long sound;"or "The *r* gives the preceding vowel a sound that is neither long or short,"[167] are nonsensical in terms of the actual relationships linguists find between speech and spelling. Teaching children such misinformation could only introduce them to a confused notion of speech and spelling correspondences. As Wardhaugh commented, the "conclusion that not many of them [such generalizations] are very useful is hardly surprising, because it is hard to imagine that a child could ever learn to read by applying a set of rules of this kind."[167]

The degree of misunderstanding about the nature of syllables seen in the writing of certain educationists is typified by the remarks of Carter and McGinnis. A more comprehensive knowledge of linguistics could have corrected their confused statement: "In addition to a knowledge of syllabication, an understanding of stress and accent is required."[26] As shown in Chapter II, the determination of stress is an integral part of the identification of a syllable. Practically all the information on phonetics supports this. It does not follow, then, that one first identifies a syllable and then determines its stress. Quite the reverse applies: one determines stress to calculate the incidence of syllables.

Equally misleading has been the insistence by certain educationists that "every vowel or vowel combination means a syllable."[47] Linguistic evidence reveals that, on the contrary, some syllables do not contain vowels. Statements like the following, then, are not alway accurate:

> A syllable is a vowel, or a group of letters containing a vowel, which forms a speech sound.[86]
>
> A syllable is one or more letters that makes a single sound and contains at least one sounded vowel." "A syllable may be defined as a vowel or a group of letters containing a vowel that form a pronounceable unit.[23]

Dawson and Bammon were also incorrect when they wrote: "...each vowel sound constitutes a pronunciation unit, or syllable."[39] And the belief that "...every syllable contains one, but no more than one vowel sound,"[50] is incorrect because Durkin forgets about diphthongs.

At even greater disagreement with the linguistic evidence about the syllable are the statements by educationists who defend dictionary syllabication with the dictum that certain *spelling patterns* should dictate syllable boundaries. These advocates believe that words with the spelling patterns of VC-CV (*bet*-*ter*) and V-CV (*de*-*lay*) should be syllabicated as indicated. We have educed that no theory of syllabication in linguistics supports this notion. The reader should remember that the distributional theory of syllabication described in Chapter II is not based on spelling patterns but on the distribution of phonemes in one-vowel words. The fact that the spelling division, V-CV, accidentally corresponds, in some cases, with phoneme distribution does not enhance its acceptability.

Perhaps even more out of keeping with the linguistic facts are some educationists' arguments that dictionary syllabication should be interpreted as a guide to the pronunciation of words, and as such, will aid children in learning to spell and read. Exemplifying the erroneous assumptions behind such remarks are the comments to teachers by Gallant, who wrote: "Given a list of words, none of which he knows how to pronounce, the pupil indicates where he would divide each word. After completing the list, he is asked to state his reason for dividing each word as he did." Gallant continues in this passage to argue that if the child's reasoning led him to divide *vessel* as *vess*-*el*, *direct* as *dir*-*ect*, or *bridle* as *brid*-*le* (which is the manner in which linguists would do it), he should be told that his reasoning is wrong.[64] Gallant's writing, then, is evidence of some linguists' contention "that most investigators of reading problems have not been aware of basic facts about sound-symbol relationships, about English grammar, about the course of language development in children, and so on."[167] One may agree with Gallant that "all of the skills of structural and phonic analysis culminate in the task of pronouncing and blending syllables to form words," but if she is innocent of the true nature of syllables, then we must also question her entire system for teaching children to read.

The remarks of Stern and Gould are another example of advice given to teachers that is untenable from a linguistic point of view: "The teacher should have a pupil pronounce such words, one after another: *ladder*, *supper*, *butter*. As the child listens to these words he easily hears the syllable division into *lad*-*der*, *sup*-*per*, and *but*-*ter*."[153] This is misinformation, because the child hears nothing of the sort. Imagine a child asking his mother for a piece of bread and *but*-*ter*! He neither hears or says the word with any such artificial syllabication of sounds. Stern and Gould also maintained that the child can be taught the distinction the dictionary makes in words like *bas*-*ket* and *ba*-*sis*. They believed the child will agree that "to keep the vowel short we fence it in between two consonants; to keep it long, it must stand alone."[153] What these writers do not seem to understand is that teaching a child to syllabicate a word in a way that contradicts his normal speech, is full of potent disadvantages. It must be particularly confusing to the second-grader, who Stern and Gould believe should be taught dictionary syllabication rules, to be faced with such a contradictory experience with language.

This misinformation about dictionary syllabication and pronunciation is even found in the writings of more well-known names in the field of elementary English education. Hildreth, for example, contended that children need "the ability to identify the syllables in words and to blend the syllables into a pronounceable word, *to*-*mor*-*row*, *tomorrow*."[87] The falsity of this advice is immediately apparent: *to-mor-row* is not the pronounceable word *tomorrow*. Equally wrong is Hildreth's belief that "words such as the following are pronounced by naming the syllables: *un-til*, *win-dow*, *pi-lot*, *sis-ter*, *cry-ing*, *din-ner*, *pil-low*." [87]

Heilman, another well-known name in reading instruction, states that people "would probably be subconsciously influenced by [dictionary syllabication] rules they had learned," [86] when they pronounce *ragmotex* as *rag-mo-tex*. The weakness of this conclusion is that no one pronounces this as *rag-mo-tex*. Consequently, Heilman's reliance on dictionary syllabication rules, and his hope that we subconsciously refer to them, appears to fall of its own weight. Tinker and McCullough would judge that any child who syllabicated these words for reading in any way other than those indicated are in "error," need "help" and "training": *let-ter*, *la-bor*, *an-chor*, *peo-ple*, *scoop-ing*, and *pes-ter*. [158] The facts remain that if children syllabicated these words *lett-er*, *lab-or*, *anch-or*, *peop-le*, *scoo-ping*, and *pest-er*; they would represent the way the words are actually pronounced. One can see many unnecessarily troublesome matters arise when children are told they are wrong by a teacher who has been given such erroneous information. We see here a typical example of the danger wrought by ignorance and/or the rejection of linguistic data.

Bond and Bond defend dictionary syllabication on a basis that is almost without defense. According to their argument, dictionary syllabication should be used because the dictionary is "the most usable book for word-recognition and word-pronunciation." [14] This argument receives no support from linguistic evidence as to the nature of the syllable. Equally unimpressive is their advice that teachers "may give the children lists of words, for each of which they indicate the number of syllables. Or the children may mark off the syllables in a list of words."[14] This is bad advice because it is necessary to read words orally--to give them their proper prosody--before syllabication can be applied. But if this is done, what is the value of marking the syllables according to the dictionary? And particularly when a spoken version of the word will not show the same syllabication that dictionary rules insist upon?

In short, one would be inclined to agree with Durkin that:

> ...still another point about phonic generalizations needs to be made, at least for those among you who might feel... that a study of generalizations is unnecessary." "Successful instruction is dependent upon successful communication which, in turn, requires a knowledge sufficiently precise to be verbalized.[50]

Knowledge, however, that does not violate the linguistic facts of the matter, which unfortunately the Durkin "knowledge" sometimes does.

Chapter III

THE RESEARCH ON TEACHING DICTIONARY SYLLABICATION

The logic of teaching dictionary syllabication to help children learn to read and spell appears impressive. It seems quite logical in teaching reading and spelling to stress first, the basic components of these learning tasks, and then to teach the child to fit these pieces together to make up a whole. However, as with other logical-appearing schemes for teaching reading* and spelling the psychologic or psycholinguistic problems involved are often ignored. The force of psychological elements in the teaching of syllabication, and their transfer into how the child learns to read and spell, doubtless can be determined best through research on the matter. As will be demonstrated, however, the practices in the structural analysis of words have neither awaited, or followed, the research on this matter.

Apparently the movement in reading and spelling to recommend the utilization of dictionary syllabication in teaching these skills came about the period of World War I. In Huey's book on the pedagogy of reading, published in 1908, nothing is said of such a practice.[93A] Yet we know that by 1924 Tidyman had highly recommended it for the teaching of spelling.[157]

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*The most well-known of these is perhaps the traditional phonics approach to reading where isolated letters are learned as if they represented isolated sounds, and where these minimal units are then combined into ever-larger units of speech and spelling.

Previously, the word family or phonogram method of word analysis had been in practice. According to Huey the New England Primer (about 1690) had both "lists of syllables such as ab, eb, ib, etc.," and "lists of words for spelling arranged according to the number of syllables."[93A] Its successor, the Webster (Blue Back) Spelling Book, published in 1783 also taught word families as did McGuffey's Readers which appeared in 1850. All of these well-known texts taught phonograms after the child had learned the names of the letters. They were "alphabet" methods, that is, spelling preceded pronunciation or reading.

Worcester in 1828 and Bumstead in 1840 exemplified the word method, that is, reading then spelling. It was not until 1870, according to Huey, that Webb's Normal Readers "began to be adopted by progressive teachers in various parts of the country, and gradually grew in favor."[93A] Webb's method, the phonic method, that is, the spelling of words according to the succession of sounds that form them, is still alive today.

Precisely when the phonogram or word family approach to word analysis was discarded by the majority of teachers, in favor of dictionary syllabication, is difficult to pinpoint. We do know that by the 1930's influential educationists such as Dolch were railing against its use. William S. Gray, the "dean" of reading specialists during this time, undoubtedly accelerated its demise with his strong stand for a dictionary syllabication of words.[72]

The Research

The actual attempts to gain scientific evidence on the teaching of syllabication* were begun over fifty years ago. By 1924 Tidyman contended that research in teaching spelling to that date showed that "the value of indicating the pronunciation of words by syllabication and diacritical marking has been definitely determined."[156] Support for his statement cannot be found, however, in the references to the published literature he provided for this argument. For example, the review of present knowledge about statistics does not lead one to an acceptance to Wolfe and Breed's conclusion in 1922 that "there was evidence of the superiority of syllabication" in their study that used syllabication to teach spelling to twenty-six matched pairs of children in grades four through seven.[170] The differences in mean scores here (while favoring the experimental group) were very small. And, considering the small number of subjects in the study, they were very likely due to chance factors. No test for the statistical significance of the differences between these means was made. The evidence presented by Greene in 1923 on this matter refuted Tidyman's conclusion. Greene did apply a test for statistical significance to the mean spelling scores of the intermediate grade pupils who he instructed using syllabic or nonsyllabic teaching of spelling. He found no significant differences in the scores between the groups.[72A]

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*All references to syllabication to follow refer to dictionary syllabication of polysyllabic words, unless otherwise indicated.

Since 1923 all the research on the matter seems to support Horn's conclusions made in the 1960 Encyclopedia of Educational Research: "The visual presentation of words in syllabicated form is apparently not in itself advantageous, and for certain types of words, such as awhile and therefore, it may be a disadvantage."[91] The evidence for Horn's decision doubtless came from King, who in 1932, tried to teach a dictionary syllabication rule to intermediate grade pupils; concluded that "considering the time required to teach the rule and the unsatisfactory results," the rule "as taught in the experiment was not worthwhile," not "profitable."[105] His conclusion is further supported by Russell's study, later in the decade, in which there was found no significant differences between good and poor spellers regarding their spelling of words orally by dictionary syllables.[140]

Two more recent studies, well-controlled and with large populations, by Horn in 1949[93] and by Dailey in 1966,[36] again denied the hypothesis that a dictionary syllabic presentation of words yields greater gains in spelling than other teaching methods. From his two studies of spelling instruction that involved "more than 1,000" fifth-grade pupils and 768 sixth-graders, Horn concluded that "there is no advantage in presenting words in syllabified form." Moreover, he noted that "there is evidence to indicate that syllabic presentation may have a negative effect on learning to spell."[93] Horn found these conclusions could be made of both fast-learning or slow-learning pupils. Dailey, in his study, found no significant differences in the spelling scores of his control and experimental groups relating to words that were specifically taught. While he did obtain statistically significant differences favoring the experimental group (who were given lessons in syllabication) for words not specifically taught, he believed the total results tended to cancel out any overall advantage of syllabication lessons.

Further evidence of the imperfect relationship between dictionary syllabication ability and spelling was also pointed out by Deasy. He obtained a correlation of only .30 between scores by intermediate grade children on tests prepared from syllabication exercises in workbooks and their scores in spelling.[40] These findings are also supported by those of Humphrey.[95] Wallin, in his study of the spelling achievement of fourteen classes of third-grade children in Sweden, found that his variable: "visual perception, syllables," did not correlate highly with any but one of the other variables of the study. Correlations of this variable with six others of the study ranged from .06 ("auditory discrimination of vowels") to .39 ("synonyms"). Only one variable "detecting like and unlike words," had a correlation high enough for predictive purposes (.74). In addition, the "visual perception, syllables" variable did not emerge as a specific factor after factor analysis was applied.[165]

Some research supporting the teaching of dictionary syllabication seems too faulty to be viewed with much confidence. For example, a study by Otterman,[125] claimed a value in teaching prefixes and root words to seventh-grade pupils. This can be discounted for our purposes, however, since this investigator gave her experimental group extra time on syllabication in addition to regular class work in English. Her control group was given no additional work in spelling. Under these circumstances any implications that her experimental group did significantly better in spelling because of the method used, cannot be accepted. Research based on designs like the above, and another done by Rogers,[138] are no longer acceptable as evidence for comparing the effectiveness of given instructional procedures.

Comments and Opinions

There have been many comments and opinions that purport to show the value of syllabication in teaching spelling and reading, but these, unfortunately, have not been documented with statistical data. For example, Horn believed he had learned "from various investigations that adults, mature students and superior spellers do tend to study words by syllables."[92] What studies there were, and who did them, Horn failed to mention. They are unknown to the present writer. Osburn also thought he observed such a phenomenon in reading: "Marvelous as it may seem, we find that, when we have taught carefully the 50 key syllables in the Diagnostic Test, the pupils need little further help because they learn to profit from transfer."[124] Again, no evidence of a statistical nature was presented to convince the skeptic that this enthusiasm was justifiable. Negative comments on this matter, such as those by Glass should also be viewed in much the same way. They are interesting and provocative, but until substantiated with data, not dependable enough for deciding the usefulness of teaching syllabication. Glass states that "we have checked carefully (for many years) and have yet to find one person who actually used syllabication principles when sounding out an unknown word." From this Glass maintained that he "can discover no reason why syllabication activities should be included in a word analysis program. They are wasteful and may even be detrimental."[70]

Related Research

There does seem to be some tangential evidence that the study of syllables might play some causal role in reading. Anderson and Dearborn quoted a study in which "subjects" were given a tachistoscopic presentation of mutilated phrases or mixed-up dictionary syllables. It was concluded from this investigation that (in reading) familiar dictionary syllables "may be the parts of the word which first attract notice." This could help explain the phenomenon in which the reader may "confuse the word with some other word which incorporates the same syllables."[5]

Winkley [169] found that if the attention of children is given to certain spellings of words that these spellings will clue them as to which syllabic of which syllable in polysyllabic words is accented. The accent will be on the vowel in these letter clusters: (a) vowel letter followed by ck; (b) two vowel letters in last syllable; (c) final syllable ending in silent e; (d) vowel followed by two like consonants before a suffix; and (e) root word. The accent will not be on the vowel in these clusters: (a) consonant followed by y in second syllable of disyllable; (b) prefix; and (c) ture or le preceded by a consonant. Winkley reported that her "accent-generalization group" (207 children in grades four, six, and eight who were taught how to apply these and other accept-generalizations to unfamiliar words) "were found to have greater 'power' in (a) ability to attack unknown words, (b) vocabulary development, and (c) comprehension," than were 202 children in the same grades who were taught only to pronounce words whose accented syllables were marked.[169]

Other evidence that children utilize the prominence or syllabics of syllables as reading aids comes from Murphy. Murphy found that middle-grade children who had not been specifically taught by her to use dictionary pronunciation "aids" did not score well on an experimental test of an oral pronunciation of words. Only 42 per cent of the words were pronounced right. She obtained a low correlation of .29 between children's scores on this experimental test and their proficiency in using dictionary pronunciation aids which included the placing of appropriate accent. It is important to note that only 4 per cent of the errors the children made were syllabication errors.[122] According to this study middle-grade children seem to recognize syllables well enough to perform well with instruction such as Winkley's.

Rettke tried to determine the influence of syllabification on reading in yet another way. He administered reading tests to middle-grade pupils in standard and in dictionary syllabified print. It was found that "mean differences in word pronunciation for the total group was highly significant and favored syllabified print." No significant differences in vocabulary, speed of reading, and comprehension were found however. Poor readers did significantly better on vocabulary and speed with the syllabified print, but the "mean differences for the good achievers in vocabulary, comprehension, and speed were significant and favored standard print."[134] Here we have some evidence that the value of using such a dictionary syllabified presentation may depend on the ability of the children under instruction. It does not say, however, that teaching a child to make the syllabic divisions Rettke gave them is of any merit. Further evidence of a positive yet incomplete relationship of dictionary syllabication and reading was given by Deasy. He obtained a low correlation (.37) between scores on dictionary syllabication tests prepared from workbook exercises and the word pronunciation abilities of children in the middle grades.[40]

Does the evidence for such a relationship between dictionary syllabication and pronunciation abilities of middle-grade children come from eye movement studies? Is the visual perceptual span of children in elementary school the syllable? We read in Gilbert's 1932 study of the eye movements of children as they learned to spell, that the "average unit of study" (a perceptual-reach distance expressed in the number of letters between eye fixations) of good spellers in grades three through six ranged from only 1.4 to 2.0 letters.[68] However, the average length in letters of the 100 most common dictionary syllables in primary grade reading material (Dolch's word list[45]) is 2.7.[19] A brief comparison of these two bodies of evidence should tend to discourage the notion that Gilbert's subjects could have learned to spell by perceiving syllables, as given in dictionaries. Ballantine found that the average number of eye fixations per em (the distance along a line of print the width of a capital M) were for grades two, four and six, 1.3, .7, and .6, respectively.[5] This would suggest that the average child in the sixth grade fixates his eyes when reading about once every two letters. As indicated, the length of the average syllable of easy words is probably about 2.7 letters One cannot say with any confidence from eye-movement data, then, that the perceptual unit in reading is the syllable, at least not as it is defined by traditional dictionaries.

It becomes increasingly apparent that the statistical evidence on this matter disagrees with Dolch's contention in 1940 that "The sounding out of syllables is a major problem in reading in the middle grades...and beyond. More research is needed to determine how it may best be solved."[48] The evidence might lead one to say, instead: "Teaching the sounding-out of dictionary syllables in reading in the middle grades and beyond is a doubtful practice. More research is needed to determine to what extent, or if, this logical-seeming procedure is psycholinguistically relevant to the task." This is particularly true in regard to reading and syllabication. There is no convincing evidence, therefore, to support statements like the one made by Boyd when she said: "The value of indicating the pronunciation of words by syllabication has been definitely determined, but the value of syllabication in spelling depends somewhat on mental maturity and appears to have greater significance in the early school years."[17]

Contributing Factors to Lack of Teaching Success

It is possible that the reason for the lack of causal relationships found between instruction in syllabication and pupils' growth in reading and spelling is explainable as the incompetence of the teacher and/or the weaknesses of the material used for instruction. It must be remembered, that it has been recognized for some time that teaching about syllabication apparently is a difficult task, and not very interesting for students. It seems as true today, as Cook and O'Shea put it in 1914, that "the almost universal resistance of children's minds to proper syllabication indicates that it is a matter of unusual psychological significance."[32]

Further complicating this matter is the knowledge that those who would teach it are deficient in their knowledge of dictionary syllabication. Dolch was certain of this in 1938: "Yet if you ask teachers, you will find very few at any level who have any clear conception of how to divide a word into syllables."[46] Later evidence from tests of teachers' knowledge of dictionary syllabication appears to substantiate his contention. Spache and Baggett found the teachers they studied achieved a mean score of 68 per cent on a test of dictionary syllabication. They interpreted this to mean that "it is questionable whether those teachers, particularly of intermediate grades, who are expected to teach syllabication can do this competently when they are so weak in the underlying phonic and syllabication principles."[151] After his review of studies on this matter Spache concluded: "Collectively these studies indicate that the average teacher is not thoroughly trained in phonics . . ." and "probably derives the slight knowledge he has by trial-and-error learning while attempting to teach this skill."[149] Support for this conclusion came from Farinella's comment based on his study of teachers' knowledge of structural analysis: "large numbers of teachers showed marked deficiency in knowledge of phonic and structural analysis skills."[56]

The lack of success in teaching syllabication could be due to dictionary syllabication itself. There are contentions that "The use of syllabication to aid in word analysis is detailed, complex, and often contradictory."[70] Or perhaps unnecessary. Many statements about structural analysis in reading imply the pupil must pronounce a given word before he can syllabicate it; "but if he can already pronounce the word, why should he need to syllabicate it?" asked

Schell.[144] Further, it has been shown that dictionary syllabication has also been made "to conform to the old school pronounciation of Latin,"[116] and distrust of Latin as a model for teaching English has been strongly voiced. It has been demonstrated, too, that "in some cases it does the reader little good to detach the suffix in order to locate the base word" (admission, deceptive), or to tell pupils that affixes form separate syllables, and to pronounce them as syllables.[144] This does not work with words like building -- buil-ding.

Linguists have noticed, as well, that "although sixth-grade students are supposed to know what a syllable is, . . . the definitions offered by most English grammars and the older dictionaries are so hopelessly inadequate as to be almost laughable."[94] As one put it, "tradition rather than reason governs in both syllabications, and the division into syllables."[116]

Perhaps the frequency of syllables in words negatively affects the readability of words, that is, the ease with which children can recognize them and get needed information from them. The evidence indicates the existence of such a relationship. The best study of readability available, a study done by Bormuth,[15] found that the number of dictionary syllables in words has a negative correlation (-.68) with passage difficulty -- where difficulty is called the mean of the percentage scores of comprehension tests on the passage. This negative r means, then, that the number of syllables in words is negatively related to the amount a reader of a passage can comprehend. Put another way, it means that passages having a high number of syllables have high grade placement scores. Or, as Bormuth noted, as syllables per word increase, close scores go down (close scores equal the number of deleted words in a passage a reader can successfully replace). Letters per syllable were found to have a low correlation (.27) with the reading difficulty of passages as defined above. This correlation is so low that one can safely say that this variable can be disregarded.[15]

The evidence from Bormuth's study is reflected in formulas such as Fry's[62 & 63] which use the total number of syllables in a 100-word passage as one of two major variables in determining reading difficulty (the other: average length of sentences). Fry's readability formula correlates highly with the following well-known formulas to the indicated degrees: Dale-Chall -.94; Flesch - .96; SRA - .98; Botel - .78; and Spache - .90.

The methods used to teach dictionary syllabication may also be a fault leading to the lack of success in teaching it, as reflected in the research literature. Lefevre thought drill on the task "more than a mneumonic device. It is demonic." "Words should seldom be artifically uttered as if the syllables were actually separated in speech."[108] Other linguists, however, are not opposed to the idea of the beginning reader becoming "aware" of the structures of syllables, as such (not dictionary syllables). Carroll, for example, explained:

> In speaking of the learner's 'becoming aware' of such a fact, we do not mean that he needs to be taught the formal verbal statements we use here; we are describing things which we believe normally even a young child can become aware of in the sense of coming to have his perception organized or structured in a certain way.[25]

Carroll believed that to accomplish this, the teacher should teach "habits of responding," not "formally stated rules." The material of a syllable may be dealt with "in terms of pattern recognition" using high-frequency patterns, e.g., -am, -ame, -aim. As a consequence, "commonly occurring syllables

. . . will come to be recognized instantly."[25] We have written in another place that "syllabification in pronunciation has not been shown to be helpful in recall of spelling, however. The ability to say and hear all parts of a word is not the same thing as attempting to learn and remember the dictionary syllabication of it."[7] Therefore, when testing a child's ability to divide a word into syllables, e.g., memory; all these divisions would be accepted as correct: me-mo-ry, mem-o-ry, or mem-or-y. Teaching the child to come to an individualized conception of the syllable, as long as each of his syllables contain only one syllabic, may have potential that has been overlooked or prohibited.[47]

Carroll's comments contradict a proposal to reject the teaching of these "high-frequency patterns" made earlier by Dolch. Dolch had calculated correctly from the dictionary that "phonograms" (as he called the commonly occurring patterns) began with vowels, while most syllables began with consonants. What was more revealing to him was that of his twenty-four "most important" phonograms (as seen frequently in vocabularies of primary grade reading texts) only about 12 per cent corresponded to (were the same as) the 8,509 syllables in a sampling of 14,000 running words in the school texts he studied. Even when these "important" phonograms were observed as parts of dictionary syllables they were found to correspond only to about 39 per cent of the syllables. Dolch judged from wrong data, however, that the "phonograms are not going to unlock polysyllables."[48] By basing his study of syllables on the dictionary boundaries of this phenomenon Dolch made a serious error of analysis. He failed to consider the phonetic, morphologic, and acoustic evidence on syllabication, consequently drawing on an erroneous source of data.

Recent research by Jones emphasized Dolch's error. Jones designed a program to teach beginning reading through the use of "graphonemes" (phonograms -- "closed" syllables and other grapheme groups, e.g., *and*, *ill*, *ate*, *ing*, *ut*, *oat*, *in*). First grade pupils were taught not to analyze words for syllables in the traditional way, but to see them as being composed of "graphonemes" (phonograms or closed syllables). As Jones explained it:

> For example, the word *terminal* is syllabicated ter/mi/nal, thus producing the open syllable *mi*. When the same word is viewed as being composed of phonograms, the open syllable no longer exists -- *term* *in* *al*, yet the pronunciation is not affected.[100]

The results of this study suggested to Jones "that the experimental method, the Phonogram Method, can be successfully employed as an approach to teaching beginning reading."[100]

This experimental evidence, coupled with the considered judgments of modern linguists,[60 & 167] seems more sensible for several reasons than the earlier unreliable advice of Dolch. One reason for this is that Dolch did not test his assumption that awareness of phonograms will not help children learn to read. More damaging to his argument, however, is the method he used to determine the dimensions of a syllable. We have seen in Chapter II that nothing in the literature of linguistic science would support the use of dictionary syllabication as the basis for deciding what is or is not a syllable. Dolch's analysis of the syllable, then, looks valid but is drawn from erroneous evidence. His error here is comparable to any study that does an acceptable job of describing and analyzing data, *but which uses the wrong data to analyze*. The statistics of any such study become rather meaningless.

Chapter IV

PEDAGOGICAL ALTERNATIVES TO DICTIONARY SYLLABICATION

The previous chapters of this monograph have revealed the weaknesses of dictionary syllabication as a method of defining the boundaries of the syllable. The features of dictionary syllabication do not impress linguists as being valid for this purpose. There is a noticeable lack of support in the literature on linguistics for dictionary syllabication as anything more than an artificial pronunciation guide or a manual for typesetters. There appears to be no evidence in linguistics to indicate that the dictionary scheme of syllabication was founded on or developed from any of the various theories of syllabication that have been explained in Chapter II.

The Genesis of Alternatives

The knowledge of linguists' rejection of dictionary syllabication was undoubtedly helpful to those who have opposed the dictionary system, and who offer alternatives to it. As we have seen in Chapter III, teaching children to syllabicate words according to the rules of the dictionary has not resulted in consistently larger gains in spelling and reading than has the nonteaching of these rules. Accordingly, the conclusions that dictionary syllabication, linguistically an artificial, presumptive, and arbitrary system, is also not an especially valuable aid to teaching, must have given impetus to the search for alternative ways of teaching syllabication.

Nonetheless, the development of an individual's concept of the syllable does seem to accompany one's general growth in oral language abilities. That is, to learn to speak, one must attend to and learn the stress or prominence features of syllables. Pedagogically this is a favorable sign. It means that children will be able to follow instructions in determining the number of syllables in words, if not the precise boundaries of these speech units.[169] This normal sensitivity to the existence of syllables gives any instruction in syllabication a firm base upon which to begin this teaching.

The previous chapters have also indicated that controversies in linguistics over the exact nature of the syllable have continued up to the present time. These arguments have arisen and are maintained largely because the nature of speech in general is so complex, as is that of the syllable, specifically. Any attempts to find a base for teaching a system of syllabication (a program in structural analysis as it is commonly called by educationists), may of necessity also be controversial. However, since there is ample evidence to illustrate the shortcomings of dictionary syllabication as a description of the syllable. It is not unreasonable or unexpected to find alternatives to the dictionary system--although any of these alternatives may themselves be imperfect.

Some Nondictionary Approaches to Syllabication

The writings of the majority of experts in spelling and reading instruction support the teaching of dictionary syllabication, as illustrated in Chapter I. These writers see no need for any alternative systems to develop children's abilities to recognize and utilize the concept of the syllable beyond that offered by the rules of the dictionary. To these experts at least, dictionary syllabication presents the most advanced and accurate forms for the structural analysis of words.

Chapter I also revealed that a minority of experts in teaching elementary English do seem aware of the opinions of linguists about dictionary syllabication. This minority therefore disagrees with the assumption of the superiority and pedagogical usefulness of dictionary syllabication held by so many. It is to the suggestions of this minority for alternatives to the dictionary system that we now turn.

A. Among educationists the most well-known opponent of dictionary syllabication is McKee. In his book, Reading,[117] he described "a definite procedure to follow in unlocking strange printed words independently." McKee cautioned first, however, that children should not be taught to recognize "short words that may be familiar" and "that could be used in unlocking the strange words" (or in short, car in carpet, do in doing, etc.). He claimed to have gathered unpublished data that would "indicate that teaching the pupil to unlock a given strange word by looking for familiar short words in it and using the pronunciations of the short words is highly questionable." Nor should pupils be taught, for example, to "note the op in shop, recall a familiar printed word that ends with the letters op, perhaps hop, think the sound those letters stand for in hop, and combine the sounds thought to arrive at shop." Refuting these procedures, McKee is left with the belief "that the pupil should be taught to use only two aids in unlocking all strange printed words: (1) the context and (2) the sounds that letters and groups of letters stand for in the word -- often called phonics."[117]

While McKee tells his readers that "the technique to be taught is simply that of using first . . . the context and the beginning sound of the word, and then only as many of the remaining sounds as are needed to make sure of the word," one can see that his plan is more involved than that. It does involve some structural analyses of words. References to structural analysis are found in his concession that knowing, for example, "the last three letters in the other strange word are an ending that stands for the sound you know for *ing*, may save time for you," as would knowing *com* and *tion*. This type of analysis, he admitted, can include "the sound of one or more syllables." (McKee did not reveal how these syllables are identified by readers). Then in grade three and beyond he urged teachers to give children a preliminary test "on the letter-sound associations they should have learned in the first two grades." This test includes "common endings and other syllables," which turns out to be a test on affixes (*ed*, *es*, *er*, *est*, *de*, *im*, *dis*, etc.).[117]

In short, McKee's alternative to dictionary syllabication results in the teaching of affixes and root words, but not recurrent spelling patterns. This is also part of the program Goodman[146] accepts, although Goodman called for teaching children to find known little words in new words and recurrent spelling patterns, which McKee failed to recommend. Wardhaugh, another critic of dictionary syllabication, also believed that work on prefixes, roots, suffixes and compound words does "have some value."[167]

Stern and Gould go even further when they insisted that "whenever possible the meaning of a prefix or a suffix should be explained. Children are interested to hear that the prefixes *un* and *re* have a special function derived from their use in Latin."[153] While Stern and Gould admitted that "unfortunately, syllabication, that is, the correct division of words into syllables, has rules of its own which often do not conform with the natural division of syllables in speech," they maintained that any mention of this disparity to children must be avoided. They insisted that if a child is to best learn to observe the "root word" in inflected or derived forms (runs-rerun) he may "say men-ding" but must "divide mend-ing."[153]

Stern and Gould's remarks have little, if any, of the validity seen in McKee's comments. They are wrong first, in assuming that a study of the morphology of affixes has anything to do with word recognition. There is no evidence available that this is true. And secondly, they are wrong in believing that a dictionary syllabication of words especially aids a child to learn to read. This can be readily discounted, as seen in Chapter III.

B. The question of whether or not to teach recurring spelling patterns, called phonograms (vowel/consonant combinations), as a substitute for syllabication was answered negatively by Dolch[46] in the 1930's as we have previously noted. There are at present educationists who would question the propriety of teaching dictionary rules of syllabication but who also reject the idea of teaching recurring spelling patterns. DeBoer and Dallman insisted that "finding at in mat could lead a child also to look for at in mate and therefore confuse him. Furthermore, even in mat, if the reader looks for at, he is likely to pronounce it mu-at."[41] Morrison believed the value of phonograms "is distinctly limited."[119A]

Other educationists who give advice on the teaching of recurrent spelling patterns are inconsistent. McKim and Caskey, for example, urged that "small words that appear as syllables or phonograms in large words are useful parts to identify early;" but that "it is not safe to teach a child to look for small words, such as it, at, in larger words as a routine word-analysis procedure."[118] These are contradictory statements because it and at are common phonograms.

Some educationists would teach recurrent spelling patterns or phonograms only if very few of these were used. Gunderson, for example, believed "it is difficult to say just how many phonograms need to be taught, but perhaps not more than ten, excluding words, consonant blends, suffixes and prefixes." She named twenty-two phonograms that are "unnecessary." These include: ell, er, ent, own, con, and oak.[74] Vail is against the teaching of syllabication:

"You must observe a few 'don'ts.'

DON'T 1) Teach the sounds incorrectly.
2) Teach to look for little words in big words.
3) Teach rules about syllabication.
4) Teach rules or sounds which are not needed."[162]

But he insisted that only the few following phonograms be taught: ef, el, em, en, es, ex, ar, er, ir, ur, or, ang, eng, ing, ong, ung, ank, ink, ous, ight, ught, and eight. These twenty-two phonograms substitute for any attention that might be given to syllabication.[162]

C. The most explicit attempt at a nondictionary system of work analysis is based on the systematic teaching of 226 phonograms, or "graphonemes," as they are referred to in a program developed by Jones.[101] She called her system of work analysis "a systematized approach to initial reading instruction." By a "systematized approach" she means a reduction of "the reading process to some simplified essence from which children may acquire the skills." The "essence"

Jones referred to can be seen to have two qualities. The first quality is what she considered the "structural unit within English words" that "causes there to be stability in the relationship between graphic representation and oral pronunciation."[101] There is some evidence that this is true about the closed syllable. It has been found that in Durrell's list of 286 rhyming phonograms in primary grade words, 95 per cent generate (can be read as) a set of stable or unvarying vowel sounds (ordinarily called "short" or "long" sounds). Of fourteen phonograms in this list that generate varying vowel sounds, Wylie noted only ten that can be found in more than one primary grade word. Therefore, phonograms which generate varying vowel sounds are found in only 109 of the 1,437 most common words in primary grade children's speaking vocabulary. It also appears that rhyming phonograms that are spelled differently (homophones), -aid, -ade, lead to little confusion in reading. The different spellings are apparently easily recognized.[171]

A closed syllable, according to Jones, is one "which begins with a vowel and ends with a consonant, semi-vowel, or 'silent e.' Such a structural unit is called a graphoneme." Examples of these three kinds of graphonemes would be the grapheme clusters an, ay, and ate.[101]

The second quality of the 'essence from which children may acquire the the skills," according to Jones, is a control over the kinds of words provided for them as they are taught to read so that "learning modules move from simple to complex." She does this by controlling the rate of introduction of spelling patterns (graphonemes), and the sequence of their introduction in the words provided the child who is learning to read. It is expected in the graphoneme system that a child will make a habitual response to a specially selected graphoneme, developed through practice in reading it in words, before the next graphoneme in the sequence is introduced. "Restricting the initial reading vocabulary of beginning readers to include largely just those words which exemplify the graphoneme concept enables pupils to more quickly and securely assume independence in word attack."[101]

Such a "closed-syllable" system of analyzing the structure of words depends for its success on whether or not the spelling patterns of words actually contain the grapheme clusters VC, VC-e, and ay-ew-ow-uy. To determine this Jones examined a random sample of 1,432 words from the Thorndike-Barnhart Beginning Dictionary (Scott, Foresman, 1964) by noting "the vc pattern in each word." This analysis obtained 3,101 syllables, 92 per cent of which could be marked as graphonemes. From this analysis one can see that the graphemes of the VC and VC-e clusters predominate. The clusters ay-ew-ow-uy seem of minor consideration since Jones found only 19 syllables out of 3,101 that contained these, in this order: ay-14, ew-1; ow-3; and uy-1. The evidence from Jones' study leads to the conclusion that on the basis of the graphoneme system "more closed than open syllables can be identified." (Only 235 of the 3,101 syllables studied were considered open, or nongraphoneme syllables).

We can see, then, how Jones employs a nondictionary method of syllabication. To completely understand this program's unique approach to syllabication it is necessary to consider certain other aspects or conditions of its use.

One of these is the tacit understanding to be gained from the description of the graphoneme system of syllabication (and therefore its guide to the pronunciation of words), that any considerations of the tone contours or inflection patterns of speech are to be avoided. We realize that the pitch, quality, loudness, and duration (prominence) of vowels in consecutive syllables are affected by their place in the sequence of syllables. In a word such as *available*, for example, some of the vowel sounds are neither long or short, but are *schwa* (ə) sounds. Affleck's evidence would indicate that about 50 per cent of syllables have this unaccented vowel sound.[3] This variance in sound has been described in Chapter II as due to the stressed-time pecularity of English. This is an obvious, and yet a very complex aspect of the phonetics of English.

We know that in closed syllables (according to dictionary syllabication), the short sounds of vowels (where vowel is written as one letter) occur in the following per cent of syllables: *a*-77; *e*-48; *i*-92; *o*-37; *u*-63 (y as short i-93).[21] Using Jones' system, which does not attend to *schwa* sounds, therefore treats all syllables as accented syllables, one could assume the child would be offered even greater reliability. The per cent of short vowel sounds found for single-vowel graphemes in *accented* syllables (dictionary syllables) is as follows: *a*-85; *e*-85; *i*-87; *o*-77; and *u*-78.[21] This reveals then, that if all closed syllables (dictionary syllables) are read as accented syllables there is a remarkable stability of grapheme-phoneme correspondence. To what extent does Jones' system improve upon or detract from this stability? This would have to be calculated separately for her system. Although Jones does treat all syllables in her instruction as accented syllables, we have shown that she determines syllable boundaries on different bases than those of the dictionary.

In consideration of the reliability factors given here, it appears reasonable to ignore the stressed-timed dimensions of speech in a phonics program prepared for young children. Such an avoidance means the child will learn after he has decoded a syllable into its syllabic sound according to the principles he has been taught, that he will still have to give the decoded vowel sound its normal prominence (pitch, stress, duration, and quality). This is a handicap common to all systems of decoding or phonics, however, and should not be seen as peculiar to the graphoneme system.[60]

Second, we note that ay-ew-ow-uy are included in the graphoneme system as "closed" syllables for arbitrary reasons. It was thought by Jones that the appearance of these clusters in many high-frequency words called for such an inclusion. The term for them used by Jones, semivowel, is not that customarily given w and y in the terminal positions in one-vowel words or syllables, however. According to Kurath, "The phoneme /j/ [first sound in yet] occurs freely in initial position and in initial and medial clusters, rarely between vowels, never finally." "The semivowel /w/ occurs only before vowels."[106]

Third, Jones introduced, with few exceptions, graphonemes with short, simple or "regular" spellings of vowel sounds before the long, or irregular spellings of these sounds. The exceptions she makes to graphonemes with regular vowel spellings in the early levels of her program are done to deal with words she felt are in the listening and speaking vocabularies of most primary grade children, as well as the books written for these children. If an irregular or complex spelling was introduced in a graphoneme before all simple or regularly-spelled graphonemes, it was apparently judged proper to do so only if the former type of graphoneme had [illegible] utility. A teacher should, Jones said, "postpone irregularity until reading skill has been acquired to a sufficient degree that pupils can adjust to the differences which exist in word structures."[101] A teacher would therefore teach *eat* first in *neat* and *seat*, and only later in *great*.

Fourth, for the purpose of developing normal-sounding sentence patterns Jones believed in an introduction, at any given time in a reading program, of a limited number of high-frequency words that do not conform to the graphoneme spelling patterns previously taught in the program. These are words to be recognized as sight words rather than according to their graphonemes.

Fifth, Jones insisted that her graphoneme system is not to be considered another "linguistic" approach like one might see in the materials of C. C. Fries.[61] Jones, in differentiating her system with linguistic programs, said her system avoids:

> ...forcing the use of several words of such identical structure within one thought unit [which] defeats the real purpose of learning to read [e.g., *Nat* *is* *a* *fat* *cat*.] Usually only two, and never more than four words containing the same graphoneme should occur in any one passage.[101]

She also contended that graphoneme analysis is different from the linguistic programs in that children:

> ...are moved as quickly as possible from monosyllabic words (where the graphoneme always occurs in lateral position in the word) to words containing more than one syllable. Thus pupils learn that *an* is a stable unit whether it occurs in initial, medial, or lateral position.[101]

There are also marked differences between Jones' system and earlier phonogram systems. For example, we can compare it with the Ward's "rational method" which Huey said was the "most increasingly and deservedly popular" of the methods in use around the turn of the century:

> After a couple of months of the "sight work," the child is taught the sounds of certain easily sounded letters, and some oft-recurring combinations (phonograms) like -ight, -ing, etc. He is drilled in blending letter sounds into words, and learns to do everything promptly at sight. The phonetic work is kept apart from reading, in the start, and the sentence is never supposed to be read until the child is sure of all its word-sounds . . . . When reading by phonetics begins, the third month, phonograms that have been learned are underlined, as in "flight," "going," and single letters are diacritically marked when this is needed . . . New sight-words, too, are continually introduced. The pupil thus gradually acquires power to read for himself anywhere, learning the words either as whole (sight-words), or through knowing the sounds of their constituent phonograms and letters, at least when the letters are marked [e.g., nāme̸d running].[93A]

Sixth. Jones made it very clear in the description of her system that the child using her method of syllabication does not have to follow the dictionary rules of syllabication. For example, while she accepted the following underlinings of graphonemes: will-ing-ness, in-sul-ate, car-pet, ham-per-ing, con-tin-ent, and plan-ted; she notes it "would be equally correct if you underlined them in this fashion: il, ins, arp, amp, ont, ant. The only requirement is that the syllable be closed.

D. Although to our knowledge no alternatives to dictionary syllabication have been undertaken by the advocates of the language-experience approach to reading and spelling instruction, the recurrent spellings, phonogram, or graphoneme system of word analysis would well serve this function in this approach. Readers of this monograph familiar with the language-experience approach[163] know that it uses the written recordings of children's everyday, actual speech as the materials from which they are taught to read and spell. Prewritten materials or published textbooks are not seen as necessary since the child in the language-experience approach is taught to recognize phoneme-grapheme correspondences by studying his own recorded language. The problems of unfamiliar syntax and vocabulary are not encountered.

Jones' graphoneme system of word analysis could be readily adapted to this language-experience approach. The data gathered by Jones[101] on the occurrence of graphonemes in the Thorndike-Barnhart Beginning Dictionary would be useful for the language-experience teacher in determining which graphonemes to teach, and which order or sequence. Use of this graphoneme system would necessitate language-experience teachers first to draw children's attention to certain selected graphonemes, probably the ones which checked vowel sounds and/or those regularly spelled. And secondly, after children had demonstrated their ability to identify those selected graphonemes in their personal language as it has been recorded by their teacher, the teacher would extend their learning to the free vowel sounds and/or more irregularly spelled graphonemes. This decision is made entirely on the evidence of the reliability of the spelling of checked vowels in accented syllables given above. In short, one should seek a reliable system when working with beginning readers.

Murphy, however, has presented some unsettling evidence as to whether older children find checked vowels easier to decode than free vowels. Her study examined middle-grade children's abilities to pronounce nonsense words when aided by a pronunciation key. She found they pronounced about 67 percent of checked vowels correctly, but also about 71 percent of free vowels. It would appear that by the intermediate grades children are equally capable with free vowels, although the range of their success in decoding them is wide: only 48 percent of long u vowel sounds were pronounced correctly as opposed to 90 percent of long e vowels.[122]

E. Linguists also have set up systems of word analysis that do not use dictionary syllabication. Representative of these "linguistic" programs is the one described by Fries.[60] Fries believed that:

> English spelling has never been "phonetic" in the sense that there has been a separate letter sign for each difference of vocal sound, and in the sense that the pronunciation of a word is simply the fusion of the separate sounds for which each of the letters stand.
>
> Modern English spelling is fundamentally a system of a comparatively few arbitrary contrastive sets of spelling-patterns, to which readers, to be efficient, must, through much practice, develop high-speed recognition responses.
>
> It misleads the pupil and sets up habits that may cause confusion later to seek constantly to match each of the individual letters with which a word is spelled with the particular sounds that make up its pronunciation.[60]

This conclusion is supported by recent research on speech and spelling correspondences. Hanna and others asked the computer to spell the 17,000 most frequently-used words in English after it had been programmed to do this with 111 rules for spelling vowels and 92 for spelling consonants. Significantly enough, the computer, using these 203 rules could spell only one-half of the 17,000 words correctly, that is, as they are spelled in the dictionary.[81] This suggests that matching words, letter-by-letter (as written) with words, sound-by-sound (as pronounced) is therefore an erroneous procedure.

Fries and other who develop "linguistic" programs, agreed they would first teach children to make "automatic responses" to the:

> . . . major spelling-patterns of English [as seen in the words man-mane-mean].
>
> The next, the second stage, covers the period during which the reader's responses to the visual patterns, the bundles of graphic shapes, become habits so automatic that the significant identifying features of the graphic shapes themselves sink below the threshold of conscious attention.
>
> Finally, the cumulative comprehension of the meanings becomes so complete that as reader he can, as he goes along, supply those portions of the language signals which the bundles of spelling-patterns alone do not represent.[60]

In terms of structural analysis it appeared to Fries that "knowledge of the major spelling patterns (and of inflectional endings) can be immediately applied by the pupil to the reading of innumerable other words formed in accordance with or incorporation or resembling those basic patterns."[61] We understand Fries to be saying then, that by applying a knowledge of the major spelling patterns and inflections, the child will be able to break down polysyllabic words into "syllables" that correspond to those spelling patterns and inflections. These smaller patterns or syllables would then be reconstructed or reunited so as to be pronounced as normal-sounding words. All mature readers, according to Fries, "do, as they read, carry along and build up such a cumulative comprehension of so much of the total meanings of a discourse that their automatic recognition-responses fill in the appropriate intonation and stress patterns." In this way, the child moves from the basic recognition of the spelling pattern and inflections to what we call "reading with expression." Nowhere in the learning process is it necessary for him to learn dictionary rules of syllabication, however. Whatever "rules" that are necessary for breaking polysyllabic words into "syllables" rests in the structure of the spelling patterns to which the child has learned to make automatic responses.[61]

Research Evidence on Alternatives

It was noted in Chapter III that results from earlier experiments with her system led Jones to conclude "that the experimental method, the Phonogram Method,* can be successfully employed as an approach to teaching beginning reading."[100] This graphoneme concept involves the question of whether certain systematic high-frequency spelling patterns can be abstracted by learners who have been taught a set learning procedure aimed at accomplishing this. The results of research by Project Literacy, which investigated this question with kindergarten and first-grade children, was reviewed by Carton:

> While only one in twelve participating kindergarteners completed the experiment, three out of five of the first graders who did show evidence of forming learning sets by solving at least 80 percent of the problems at the end of the five-day study. The conclusion that these young pupils actively searched for an underlying pattern on principle, even if it was a wrong one, was substantiated by individual response patterns, by the remarks of the pupils, and by the fact that those who had not succeeded in abstracting the patterns scored consistently at less than chance levels.[26A]

If these abstractions of spelling patterns can be accomplished by some pupils with instruction of such a very short duration, it becomes credible that it could be accomplished for a great many more over the normally extended period of reading instruction used in schools.

Examinations of the effectiveness of the so-called linguistic approaches that stress recurrent spelling patterns rather than dictionary syllabication as the basis of word analysis have also been made. Chall, in her comments on these studies, concluded that:

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*A prior name for the graphoneme concept.

> . . . at the end of Grades 1 and 2, the linguistic programs, when compared to basal programs, tended to produce better results in word recognition and spelling, although no significant differences were found in comprehension. However, a phonic-linguistic approach (one that taught sound-letter correspondences directly and used illustrations as well as words controlled on spelling regularity), when compared to basal programs, tended to produce better results in word recognition, spelling, and reading comprehension at the end of Grades 1 and 2.[27]

It can be seen that the "linguistic programs" do not stress structural analysis in grades one and two. However, the evidence of their superiority over the traditional basal readers can be interpreted to mean that generally, children taught the recurrent spelling patterns to word recognition, perceptually, are more firmly grounded in the elements they will need for structural analysis. That is, as these children have learned to habitually and fluently recognize recurrent spelling patterns, they should be able to transfer, with little difficulty, these perceptual habits into a breakdown of polysyllabic words. While this assumption still needs experimental verification, it appears to be compellingly logical.

Jones' graphoneme approach, which differs from the linguistic approaches, does require learners in the early stages of her reading program to recognize polysyllabic words according to graphonemes. Thus, before one-half of the graphonemes in the eight levels of her latest program have been taught, children are expected to structurally analyze polysyllables such as: animals, another, children, little, number, pictures, snowflakes, surprise, and teacher. Jones has not, at the time of this writing, published any evidence relating to students' abilities to make nondictionary structural analyses. There is a forseeable difficulty in the application of the system to words such as *regret*, *deprive*, *preclude* and *protract*, but by the time children in the graphoneme program are ready to decode such words their ability to shift the sounds of vowels then give to vowel letters may be versatile enough to preclude this as a problem.

Other recent evidence that lends support to the usefulness of teaching a recurrent-spellings, graphonemes, or phonograms method of word analysis such as Jones', has been given by Wylie and Durrell.[171] Approximately 450 children "who showed normal intelligence and reading progress" were examined by Wylie at the end of the first grade. These children had been in a phonograms program of word recognition for a year. Wylie (a) asked 230 of these children to circle (identify) *short-vowel phonograms* after hearing them read aloud, and to do the same for single vowel letters after hearing *isolated vowel sounds*. The whole phonogram was found to be significantly easier to identify than the isolated vowel letter. He (b) asked all the children in his study to identify in the same way phonograms with *long versus short* vowels. There was found no significant difference in the pupils' abilities to do this. Using the same procedure he (c) found no significant differences in these pupils' abilities to identify *"silent e" phonograms (e.g., ate) as versus vowel digraph phonograms (e.g., ear)*. The pupils then (d) identified significantly larger number of *short or long vowel phonograms* than they did *phonograms with other vowel sounds*. The pupils also (e) identified significantly larger number of phonograms that ended with *single consonants* than those that ended in *two-consonant clusters* ("blends"). Wylie

(f) found that "high frequency" phonograms (those found in more than ten primary grade words) were identified significantly more times than "low frequency" phonograms (those found in from five to ten primary words).[171]

As final support for the teaching of phonograms or graphonemes, the evidence gathered by Bennett is relevant. She found that of the errors made by 595 retarded readers only 15 per cent were the medial vowel. As has been described, the medial vowel is the sound/letter with which the phonogram or grapheme begins. Therefore, if only a relatively few errors are likely to occur here, even with retarded readers, the probability for the success of this system must be enhanced.[9A]

Chapter V

SUMMARY AND RECOMMENDATIONS

This monograph was written to describe the true nature of the syllable as a means for determining its usefulness as a tool in teaching children to read and spell. To accomplish this purpose it was found useful to relate some early historical conceptions of the syllable to the thinking about it found in the literature of modern linguistics. Specifically, this was the modern literature concerning phonetics which, as illustrated, in its scientific discussions of the syllable presents a contrast to the defenses of dictionary syllabication found in the majority of the writings educationists call phonics.

Summary of the Monograph

A. This monograph has demonstrated that the nature of the syllable remains a highly controversial aspect of phonetics. Writers in this field of linguistics have defined the speech phenomenon, syllable, in at least four different ways.

First, the syllable is described or explained on the basis of its characteristics of stress or prominence. These features of the syllable involve what is known as pitch, duration, loudness, sonority, juncture (as this includes the allophonic nature of phonemes), contour tones, and the inherent qualities of vowel sounds.

Second, we have noted that some phoneticians believe that sonority, stress, and prominence can be converted into an acoustically meaningful statement only by means of mechanical recordings by the spectrograph. These acoustic phoneticians believe that a truly objective version of the syllable and its boundaries will be arrived at only if the spectrum of the spoken vowel, as it exists in the open air, is translated into a printed recording of the speech waves it makes.

Third, we have described the position of other linguists who believe that a scientific definition of the syllable will best be accomplished through the studies of this phenomenon that recognize this speech unit to be of a physiological nature, rather than of a linguistic or acoustical one. These defenders of the "motor correlate" of the phonemic syllable see the best answer to questions about the nature of the syllable to lie in studies of the expiratory chest muscles during the process of the speech act. They therefore believe that the phonetic syllable should be considered essentially a movement of the speech organs, not as a characteristic of the sound of the speech organs.

Fourth, we presented the thinking of linguists who believe that the syllable should be defined according to the distributional features of the phonemes in the language, especially as these are found in one-vowel words. The evidence they present is taken from studies that usually analyze these words in English to determine the permissive clusters of phonemes they contain. These linguistic researchers contend that while studies of stress or prominence may reveal the maximum or crest sounds in syllables (the syllabic of the syllable), they tell very little if anything about the boundaries of syllables. They believe that the traditional linguistic theories of the syllable provide little evidence about syllabic boundaries and cannot fully describe the syllable. The distributional theorists believe that the data concerned with the relative frequency of the occurrence of various combinations of phonemes in words will yield the most reliable information about this.

Fifth, the survey of the discussion of the syllable as a linguistic phenomenon, undertaken for this monograph, did not uncover evidence from linguistics that supports the notion that the system of syllabication used by dictionaries is based on true or defensible descriptions of the boundaries of the syllable. It has been shown how this lack of linguistic support for dictionary syllabication conflicts sharply with much of the advice given to teachers by writers of phonics. These latter writers have contended that dictionary syllabication rules are proper and should be taught to children as a means of teaching them to read and spell Linguists see the rules of dictionary syllabication as irrelevant to an accurate description of the syllable; the few who do comment on the teaching of English advise teachers not to teach the dictionary rules.

B. Despite the conflicting theories of syllabication held among linguists, they do agree on several aspects of the syllable. One, they believe that the syllable, not the individual speech sound (phoneme), is the irreducible unit of speech. Speech sounds only come to life as they are spoken in syllables. Two, they concur that only certain combinations of consonants and vowel phonemes are permitted in the English syllable. For some reason, the native speaker of English does not use all the combinations that are possible with the sounds of his language. Three, there is little dispute over the statement that English is a stressed-time language. A syllable is given a certain stress in English because of its position in the sequence of syllables in a given utterance. Four, it is conceded that the sounds of separate syllables seem to one's ear, at least, to imperceptively glide and blend into one another. This obviously complicates any non-mechanical effort to distinguish the boundaries of separate syllables. *Five*, the notion of checked-vowel "closed" and free-vowel "open" syllables seems well accepted. Syllables are heard to have different vowel sounds if they end in a consonant, (closed) from those heard when they end in a vowel (open). *Six*, the evidence from acoustics research that reveals the common vowels in syllables have inherent differences in their mean relative intensities, is never disputed. Thus, the vowel sound in *cap* has about five times as much intensity, according to one research study, as does the vowel sound in *pit*. *Seven*, it is universally agreed that syllables have a nucleus which is the prominent sound of this speech unit. A larger degree of the combination of stress, pitch, sonority, duration, tone, and loudness is usually found in the vowel sound. But, *eight*, it is generally judged that some syllables' nuclei are not made up of one vowel sound. Diphthongs are made up of two sounds. The consonant sounds /l/, /m/, /n/, and /r/ sometimes are the nuclei of syllables.

C. The conflict between the writers of phonetics and the writers of phonics over the true nature of the syllable has been described in several places in the monograph. Linguists who write phonetics have been shown to view the syllable as based on the speech act, and to say that as speech is complex, so is the syllable. Therefore, this phenomenon generates a great deal of controversy in phonetics. Most writers of phonics, however, have seen the boundaries of the syllable to be simply as these are described by the dictionary. They insist that the teaching of the dictionary rules of syllabication is proper. But these are the very rules for the syllable that linguists find untenable.

D. A resolution of the polarized views of linguists and educationists over the syllable was also attempted in this monograph as we turned to the research on the effects of teaching dictionary syllabication on children's progress in learning to read and spell. It was hypothesized that although certain educationists' views on the syllable did not accord with the linguistic facts, the teaching of dictionary syllabication may actually be effective, for some unknown reason. The evidence from the research attempting to answer this pragmatic question, was seen almost with exception to say, however, that the teaching of dictionary syllabication did not result in consistently higher gains in children's reading and spelling than did a nonteaching of this form of syllabication.

E. Finally, this monograph recognized the minority of writers of phonics who appear to be aware of and in agreement with the linguistic view of the syllable. These are the educationists who couch their advice about the usefulness of the syllable for teaching reading and spelling in terms that correspond to those used by linguists. As might be expected, these dissenters from the dictionary description of syllabication have posed alternative programs of word study that avoid the use of the rules of the dictionary. These alternative programs for the structural analysis of words vary from those explicit and comprehensive in their designs to those which state that, while dictionary syllabication should be avoided, the child needs nothing more to make a structural analysis of words than to understand root words and the ways these roots are inflected.

Recommendations

The most difficult and therefore potentially treacherous aspect in the writing of this monograph is recommending new ways teachers should view the syllable, and what they should do with these perceptions in their instruction to children. The need to find better and additional ways to help children learn to read and spell dictates that we fulfill this obligation, however unsure we are in the completion of such a task. It is with these reservations, then, that advice on this matter will be given.

Based on our discussion of (a) the syllable as a linguistic phenomenon, (b) the experimental evidence of its use as a tool in teaching, and (c) the programs in word analysis that dissidents to dictionary syllabication have proposed, it appears reasonable to us to accept the following as guidelines to the future teaching of syllabication:

First, and most importantly, teaching rules that correspond to some selected dictionary syllabication of words is not worth the effort. The research on spelling and dictionary syllabication affords little comfort to the teacher who believes that students become better spellers if time is taken to teach dictionary based rules of syllabication. It is dubious that such instruction will lead to greater gains in spelling, than would the same time spent in more direct instruction in the correspondences of sound and spelling. We believe that this lack of success stems from the faulty concepts of the boundaries of syllables that were taught in these experimentations. While the lack of convincing evidence in the research on reading regarding this matter is apparent, we do find evidence however, that increasing the child's awareness of prominence does appear to have some potential.[169]

If one would believe the practice of teaching young children to syllabicate words according to the dictionary at the ends of lines need not be required in elementary school rhetoric, this reduces one other defense for teaching dictionary syllabication. If it is felt this formalism must be taught, we believe it can be best done in levels of schooling beyond elementary school, when such niceties of format have more far-reaching social consequences.

Second, it is inconceivable to us, however, that bringing to children's attention an important element of our language, the phenomena of the syllable, can not but help them in spelling and reading. We are compelled to believe that the idea of syllabication "the working unit of pronunciation," as Lloyd and Warfel call it,[112] is too basic an element of phonology or phonetics to be dismissed as useless in teaching children to spell and read. We should not let the evidence from the research which demonstrates the ineffectiveness of the teaching of dictionary syllabication on growth in spelling and reading deter us from this belief.

This hypothesis does require that we see the teaching of syllabication in a different form than the one generally advised. In consideration of the fact that even the authorities in phonetics cannot totally agree on the true or essential limits of the syllable, should not the teacher be urged to experiment with syllabication procedures different than those dictated by the rules of dictionary syllabication? In turn should not the teacher encourage his pupils to divide words for the purposes of spelling and reading as his linguistic intuition guides him? We see no reason why not.

The forms and exercises of such intuitiveness can best be described through an example. If pupils find they need to spell a word such as factory, they could rely on their abilities to listen for the sounds of its vowels, and then attach to these sounds the consonant sounds that seem to make up vowel-consonant clusters. One pupil might decide he hears *fac*-*try*, another *fact*-*ry*, another *fac*-*tr*-*y*, another *fac*-*tor*-*y*, and yet another *fact*-*r*-*y*, and so on. (Differences in dialect might condition this.) Any of these pupils might very well spell the word as *faktre*, or other soci[illegible] unacceptable ways, this is not the issue. In all the instances, the lack of regular correspondence of sound and letter in the spelling of most words would add to the task. With *faktre*, however, a pupil could be said to have demonstrated he recognized (a) the word had parts, syllables or syllabics; and (b) their constituents -- vowels and consonants sounds and graphemes. He could be said to have learned, for example, that /r/ has vowel characteristics when it occurs in certain places in words.

Other long words, such as *investigate*, the pupil might (a) hear *in*-*vest* *i*-, (b) note the natural or open juncture between *in* and *vest* (no word begins *nv*) or *ves*-*ti*- or *ves*-*tig* or *vest*-*ig*; and then (c) say *gate* (or *ate*). Whatever the combining or clustering of vowel and consonants (after the open juncture) for each "syllable" that is made, this free-wheeling division would be a better way of helping the pupil keep in mind the sounds and graphemes of the word as he spells it than some hoped-for application of a memorized rule based on dictionary syllabication. Correct pronunciation of such free-wheeling syllabication can both help and hinder a "correct" spelling. A spelling such as *investugat* might indicate that while syllabication helped, the correct pronunciation of the word was both a help and a handicap.

Whether in this process the pupil would inevitably hear closed syllables, e.g., (*vest*), or "graphonemes" (*est*) as Jones seems to imply,[101] or some combination of closed or open clusters of vowels and consonants; remains an empirical question. Pupils would probably be aware of open junctures. Research on this point would be very helpful, and might reveal that the reason that "calling attention to difficult parts of words in presenting the words of a lesson is a doubtful practice"[91] is because the "hard spots" are not heard in the same parts of words or syllables by all children. Teaching these hard spots as if they were heard the same might account for the rather surprising evidence that such instruction has "little or no value."[91]

There is some evidence that noting syllables will not be difficult, at least for intermediate grade children. Murphy's study of middle-grade children's ability to pronounce words according to a pronunciation guide revealed that only about 42 per cent of the words were given a correct pronunciation. But, less than 4 per cent of these errors were syllable errors, which indicates that the pupils in this study experienced few difficulties with syllabication.[122]

Free-wheeling syllabication might also prove to be useful in reading instruction, that is, going from spelling to sound. Here again, no time for learning dictionary-based rules of syllabication would be required. Time could be spent, instead, having pupils visually determine the limits of syllables according to their individual aural-visual perception of vowel and consonant clusters, just as they did in the above example going from sound to spelling. The goal would be one of approximately, that is, for the word investigate the same clusterings as seen in the spelling example might be made. The pupil should soon become aware of frequently occurring patterns or graphonemes: in/est/ate, and recognize these as wholes. An example of this approximation can be illustrated with the word *demonstrate*. The pupil might visualize the clusters here to be *dem*-*ons*-*trate*, but pronounce the first cluster *dēm*, the second *ōns*, and the final *trăte*. It should be hypothesized that this pronunciation would approximate the true one in the child's aural recognition vocabulary to the extent that he then could quickly make the necessary phonemic corrections. This is something like diaphonetics, which is illustrated by the Mississippian's ability to understand the speaker of British English and vice versa.

Third, while we would encourage "free-wheeling" syllabication by children, we do not reject proposals, like that of Jones,[101] that children be *systematically* taught to perceive the recurrent spelling patterns of our language. We are lead by the logic of this system to contemplate further how the perception of these common spelling patterns could be improved.

It is useful, for example, to speculate what the results would be of using color cues as an aid to children's perceptions of Jones' "graphonemes." (see Chapter IV) Research supports the hypothesis that young children are able to match words more accurately when color cues are added in contrast to the same task with words printed in black and white. For instance, Kenneth Jones found that 110 nursery school children did significantly better on matching tests of words and letters when these were in color than they did when the words were in black and white, moreover the children indicated a preference for the color tests.[99] In his review of such studies, Otto saw their implication to be:

> . . . that children's paired-associate learning should be enhanced by the addition of color cues for any or all of the following reasons: aided perception and increased differentiation, the opportunity for cue selection, and greater motivation. Furthermore there is the additional possibility that color may serve as a vehicle for mediation.[126]

This also seems a reasonable assumption about graphonemes since the task of identifying graphonemes in words resembles in certain respects paired-associate learning. The learner, in both instances, is stimulated to generalize a perceptual image so as to be able to transfer this in, or into, another image--in the case of graphonemes into an unfamiliar word.

The addition of color cues to the perception of graphonemes, might provide a better system for explaining or teaching the graphoneme concept to students. As many teachers of young children readily admit, the child's performance according to teacher directions is often adversely affected by the child's inability to attend to oral instructions and to exemplify these with his visual behavior. In short, the child does not perceive what he is asked to look at. The teacher of graphonemes giving oral instructions about this concept must explain or orally direct his pupils to perceive the clusters of letters called a graphoneme. Explanations of this sort are acoustical, however, out in the air. They require a second-level application by the pupil to the object being perceived, a visual application. If the teacher initially used a strong visual cue (color) as his first explanation, the pupil presumably would not be required to interpret or filter an oral language description before he began to direct his visual perception. He could instead begin this task of visual performance almost immediately through a paired-associate form of learning: one isolated graphoneme in color matched with a second one in color, the second being seen in a word (est--nest).

Fourth, there are no apparent reasons why the advocates of the language-experience approach to reading and spelling teaching should not encourage the use of the recurrent spelling, phonogram, or graphoneme systems of word analysis. Although there are some advocates of the language-experience approach who defend the use of dictionary syllabication,[75] the artificial rules for the boundaries of the syllable set by the dictionary seem as inappropriate for this unorthodox approach to the teaching of reading and spelling as they are for any other method. The language-experience technique, which is based on the use of the actual speech or dialect of the child, would not present any special difficulties in implementing this nondictionary approach to word analysis. The language of children, put into writing as they speak it, will produce all the important recurrent spellings or graphonemes that would be included in a prewritten program. The particular advantages of the language-experience approach[163] are not likely to suffer in the process.

Fifth, it appears to us that if a choice is to be made between the two well-developed and published nondictionary syllabication approaches toward word analysis, (a) the "linguistic"[60] and (b) Jones' graphoneme concept,[101] the latter is to be preferred. One advantage of the graphoneme approach is its concern with the utility of words. It seems more likely to use critical, high-frequency words even though they may be irregularly spelled or not follow graphoneme patterns. Two, children are taught polysyllabic word analysis earlier in the graphoneme program, allowing greater attention to be given to a denotative style of writing. Three, the graphoneme program written by Jones is more explicitly concerned with the structural analysis of words, an aspect to which the linguistic programs give only indirect attention.

Sixth, we believe that none of the above recommendations violate the information on the true nature of the syllable that we have gained from the pertinent literature in linguistics. This literature indicates that the early human (the child as he begins school) is unconsciously aware, as was early man, of the nature of syllables. We must assume that for the child to have been able to develop his ability to speak English he has attended to and learned how to give the proper prominence to vowel sounds (or more properly, the syllabics) of syllables. This recognition and production of the crest sounds in our stressed-time language (done before the child comes to school) provides the background of experience, or readiness as it is called, needed to teach him to consciously recognize syllables.

Our recommendations are influenced by the evidence about the syllable from linguistics is influential in other ways. For example, if the syllable is the basic unit of speech it should be learned as such in reading. The phonogram or graphoneme systems designed for this purpose therefore gain substantial credulity. The belief of linguists that the syllable is the irreducible unit of speech appears to be further substantiated by the child's ability to learn suprasegmentals, the tone contours, and the prominences of syllables before he can correctly articulate all the separate phonemes.

But, conversely, it appears to us that the evidence from linguistics on the inherent relative intensity (loudness) of vowels, versus the duration and sonority given them, is too complex a matter to introduce into a program of word analysis for young children. The notion of checked versus free vowels (closed versus open syllables) can be useful, however.

We are not persuaded further, however, that the child can be taught to utilize the data on the distributional features of phonemes in English so as to identify the boundaries of syllables as he learns to read and spell is still unproven. While we encourage a "free-wheeling" form of syllabication by the pupil, we are not convinced, otherwise, that children who can learn to discover that the prominence of syllables is an index to frequency, can thereby also utilize the data on the distributional aspects of phonemes. (The reader will remember that these studies analyzed *butter* as *CVCVC* and *gadget* as *CVCCVC*.)

It appears to us, to the contrary, that the child cannot be successfully taught to apply the conclusions obtained by the distributional theory of the syllable since to do so *he must be able to pronounce a word before any of these conclusions about syllable boundaries can be applied to it*. For example, with the two-syllable word *gadget*, these distributional data would be interpreted to say that the boundaries of the syllables of this word are VC-CV (*gad*-*get*). We would agree with this. But at the same time it can readily be seen that unless the child can pronounce "gadget" he cannot identify the word's sequence of letters as representatives of the phonemes: /a/--/d/--/ǧ/--/e/. In short, systems of word analysis should not be intended to teach a child to apply syllabication to words he can already pronounce, but aid him, *as heavily as possible*, in making his first or preliminary pronunciation of any unfamiliar word *its normal pronunciation*. We have shown that while all systems of word analysis necessarily suffer from their inability to do this, a system based on the rules of dictionary syllabication is particularly bad in this respect (e.g., it would content that *but*-*ter* is the best available pronunciation guide for *butt*-*ər*).

We have maintained that the recurrent spelling or graphoneme system is a "natural" way for children to learn to distinguish the boundaries of syllables.

This is particularly recommended, considering the great controversies that remain with this main issue. A question still remains, how to teach children to understand the phenomenon of the "free or open" syllable? Eventually children will have to read words such as *cowardly*, where the checked-vowel, closed syllable system will not serve as a guide to vowel pronunciation. One answer is the introduction of the child to words such as *go*, *see*, *blow*, *day*, *cue*, *few*, *cow*, *boy*, etc.; as open syllables in preparation for reading words such as: robust, deity, gracious, python, possess, royalty, rowdy, etc. The evidence from studies of phoneme distribution showing that CV occurs at the end of one-vowel words with the same frequency as VC, gives added support to this alternative.

In terms of teaching strategies, it probably would be wise to delay a teaching of the "free or open" syllables until children have largely established their perception of closed syllables, particularly if the decision to do this is based on which vowel sounds, "short or long," occur more frequently in monosyllabic words. As Dechant noted, "The short vowels are usually introduced before the long vowels because they occur most frequently in monosyllabic words, are phonetically more consistent, and occur more frequently in words that the pupil meets in initial reading."[42A] But by "phonetically more consistent," Dechant appears to say that with words in general there is a much smaller number of different spellings for short vowel sounds than for long vowel sounds. One can calculate from Hanna, otherwise, however that his data on phoneme-grapheme correspondences indicated there are 73 different spellings given to the five long vowel sounds, as opposed to 66 for the five short vowel sounds Dechant described.[81] (The recommendation that the *schwa* sound, as in carton, be taught as a stressed short vowel raises the total of 62 to 66 by including the four ways the schwa sound can be spelled that short vowels cannot.) Also relevant to the issue is the evidence that children, by the time they are in the middle grades, experience no more difficulty decoding free vowels than checked vowels.[122] Further complicating this situation is the yet more recent evidence that primary grade children find it no more difficult to decode free vowels than checked vowels.[171]

Seventh, and finally, the evidence gathered for this monograph reveals to us the immediate need for further research into the syllable (as defined by linguistics) pertaining to its usefulness in teaching children to read and spell. The evidence from linguists as to the artificiality of dictionary syllabication makes it imperative that previous studies that have been involved with, or were based on dictionary syllabication be redone. Some of the evidence in the research by Clymer[30] and others, for example, on the utility of phonic generalizations becomes highly unsatisfactory if one rejects the notion of dictionary syllabication.

It is our belief that the rejection of dictionary syllabication for teaching purposes is inevitable. Surely a change of opinion and practice would result if teachers and educationists were re-educated regarding the weakness of dictionary syllabication as a genuine description of the boundaries of the syllable. Hopefully, this monograph will be of some help in the implementation of this re-education. If it in any ways acts as a stimulus toward changing the opinions of teachers and educationists, or as a signal for new research on this matter, our efforts in writing this monograph will be amply justified.

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